

Vermont



Nulhegan River from the Nulhegan Basin Division, Vermont

State of Vermont

- **Nulhegan Basin Conservation Focus Area (Existing Refuge Division)**
- **Ompompanoosuc Conservation Focus Area (Proposed)**
- **Ottauquechee River Conservation Focus Area (Proposed)**
- **West River Conservation Focus Area (Proposed)**
- **White River Conservation Focus Area (Proposed)**
- **Putney Mountain Unit (Existing Refuge Unit)**

Overview Nulhegan Basin Conservation Focus Area (Existing Refuge Division)

Lewis, Bloomfield, Brunswick, Ferdinand, and Brighton, Vermont

| Conservation Focus Area (CFA) — Acreage Profile | Acres | Percentage of CFA |
|---|--------|-------------------|
| Total CFA Acres to be Conserved by Service | 32,541 | 98.9 % |
| ■ <i>Existing Refuge Ownership in CFA</i> ¹ | 26,605 | |
| ■ <i>Additional Acres in CFA proposed for Refuge Acquisition</i> ² | 5,936 | |
| Existing Acres in CFA Permanently Conserved by Others ^{2,3} | 368 | 1.1 % |
| Total Acres in CFA ^{2,4} | 32,909 | 100 % |

¹Acres from Service's Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

The existing Nulhegan Basin Division is part of the larger 132,000-acre Kingdom Heritage Lands. The area includes a mosaic of conserved lands, including the Wenlock and West Mountain Wildlife Management Areas and working forest lands (e.g., Plum Creek Timber Company). Our proposed expansion to the Nulhegan Basin CFA would fill in gaps in the conserved lands network within this larger core area and better protect the Nulhegan River watershed, particularly a very rich, northern boreal wetlands complex.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Spruce-fir – 55.7 percent.
- Peatlands – 1.2 percent.
- Shrub Swamps and Floodplain Forest - 1 percent.

See map A.59 and table A.41 for more detailed habitat information for the CFA.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.42 below, there are eight refuge priority refuge resources of concern (PRRC) terrestrial and aquatic species that rely upon the diverse habitats in this CFA. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to biological integrity diversity and environmental health (BIDEH) of the landscape. The refuge will seek to protect and restore (if necessary) these habitat types. Additionally, we recognize the value of this area to Canada lynx, a federally threatened species recently confirmed breeding in northeastern Vermont, and as a deer wintering area for white-tailed deer. These species and others are discussed further below.

1. Federal Threatened and Endangered Species

Canada lynx, a federally threatened species, have been confirmed breeding in northeastern Vermont. A family group was detected in the winters of 2012 and 2013 within the Nulhegan Basin CFA. In consultation with the Service's New England Field Office, it was concluded that the refuge will not manage habitats specifically for Canada lynx. This determination was based in large part, on our understanding that the use of these lands by lynx and their long-term occupancy potential are poorly understood. In addition, critical habitat for Canada lynx in Vermont has not been designated under the authority of the Endangered Species Act, and neither the State of Vermont nor the Service has developed a lynx recovery plan.

Conservation efforts for this species will be done at the regional scale, and additional information is necessary to evaluate the importance of Vermont for Canada lynx and to determine what measures are needed to ensure their persistence within the State. We will continue to monitor Canada lynx populations in the Nulhegan Basin CFA, and work with partners to develop a lynx management plan for the State. We will also work with our New England Field Office to ensure that none of our programs or activities could result in an incidental take of lynx.

2. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA) and habitats along the river's main stem receive higher use by migrating landbirds. As birds move north, they disperse beyond the Connecticut River main stem, becoming more evenly distributed in habitats across the watershed (Smith College 2006). The Nulhegan Basin CFA not only provides important stopover habitat for migrating landbirds, but breeding habitat as well.

The Nulhegan Basin CFA is part of a larger 132,000-acre conservation area known as the Kingdom Heritage Lands. The CFA is one of three large parcels that were conserved through a complex partnership of public and private entities, including the Vermont Agency of Natural Resources, and now, Plum Creek, LLC. This combination of ownerships and easements provides long-term conservation of contiguous habitat important for many species, including migratory birds.

The bogs, fens, shrub-dominated wetlands, and swamps, as well as lowland conifer, montane, and hardwood forests in the CFA support a diversity of breeding birds. Six years of breeding landbird survey data, and countless observations made by expert birders have detected numerous species of high conservation concern. Several of these species are uncommon in the Northeast, occurring at the southern periphery of their range. These include resident and migratory boreal species including boreal chickadee, black-backed woodpecker, spruce grouse, gray jay, bay-breasted warbler, rusty blackbird, and olive-sided flycatcher. The contiguous forests in the Nulhegan Basin area also provide habitat for forest interior species such as Canada warbler, ovenbird, blackburnian warbler, black-throated blue warbler, and black-throated green warbler. Blackburnian warbler, Canada warbler, and black-throated blue warbler are PRRC species that require different plant species composition and structure within a mature forest. While American woodcock and rusty blackbird, also PRRC species, rely on early successional forests in the CFA.

3. Waterfowl

Shrub swamps, peatlands, slow moving streams, secluded ponds, and numerous beaver wetlands provide breeding and migrating habitat for various waterfowl species including American black duck, a PRRC species, wood ducks, common mergansers, hooded mergansers, and Canada geese.

4. Diadromous fish and other aquatic species

The Nulhegan River and three of its four major tributaries—the North, Yellow, and Black branches—flow through the Nulhegan Basin CFA. These cold water rivers provide important habitat for PRRC species including brook trout and Atlantic salmon. Both of these species are a high priority for conservation for the State and the Service's Northeast Region. Native brook trout populations are also present in Lewis and McConnell Ponds within the CFA.

5. Wetlands

The CFA is predominately forested, interspersed with streams and various wetlands. More than 3,000 acres of conifer dominated forested wetlands occur in the CFA, as well as 413 acres of peatlands and 348 acres of shrub swamp and floodplain forest. The majority of these wetlands are concentrated in the lower elevations, and associated with the streams and ponds in the CFA.

6. Other

The Nulhegan Basin contains a deer wintering area (DWA), which is important to the species' survival during winter. DWAs have two important components: core areas of softwoods with high crown closure that provide shelter, and patches of mixed hardwood providing accessible browse within or near the core of the DWA. Functional shelter for deer includes softwood cover at least 35 feet tall with at least 70 percent crown closure (Reay et al. 1990). In addition to providing shelter from severe weather and accessible browse, good wintering areas ensure that deer can travel easily to forage and escape predators.

Within the CFA, the majority of the basin bottom was historically used by wintering deer. Management within this area will focus on providing a multi-age lowland spruce-fir forest with an appropriate age and diameter distribution for core winter shelter, and early successional forests for winter browse. A diversity of forest composition and structure will also provide habitat for refuge priority resources of concern.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

- Forest management activities will provide diversity of seral stages including early successional and mature forested habitats. Forests in the CFA will be structurally diverse (different size classes) and native species will dominate. Appendix J provides general forest management definitions and guidelines.
- Our wetland management will focus on maintaining the natural hydrology and native species composition. Given their low occurrence, invasive plant management will be a priority.
- In open water habitats (streams, rivers and ponds), we will focus on maintaining forested stream buffers, structurally diverse instream habitat, and continuous aquatic species passage to spawning and wintering habitat.

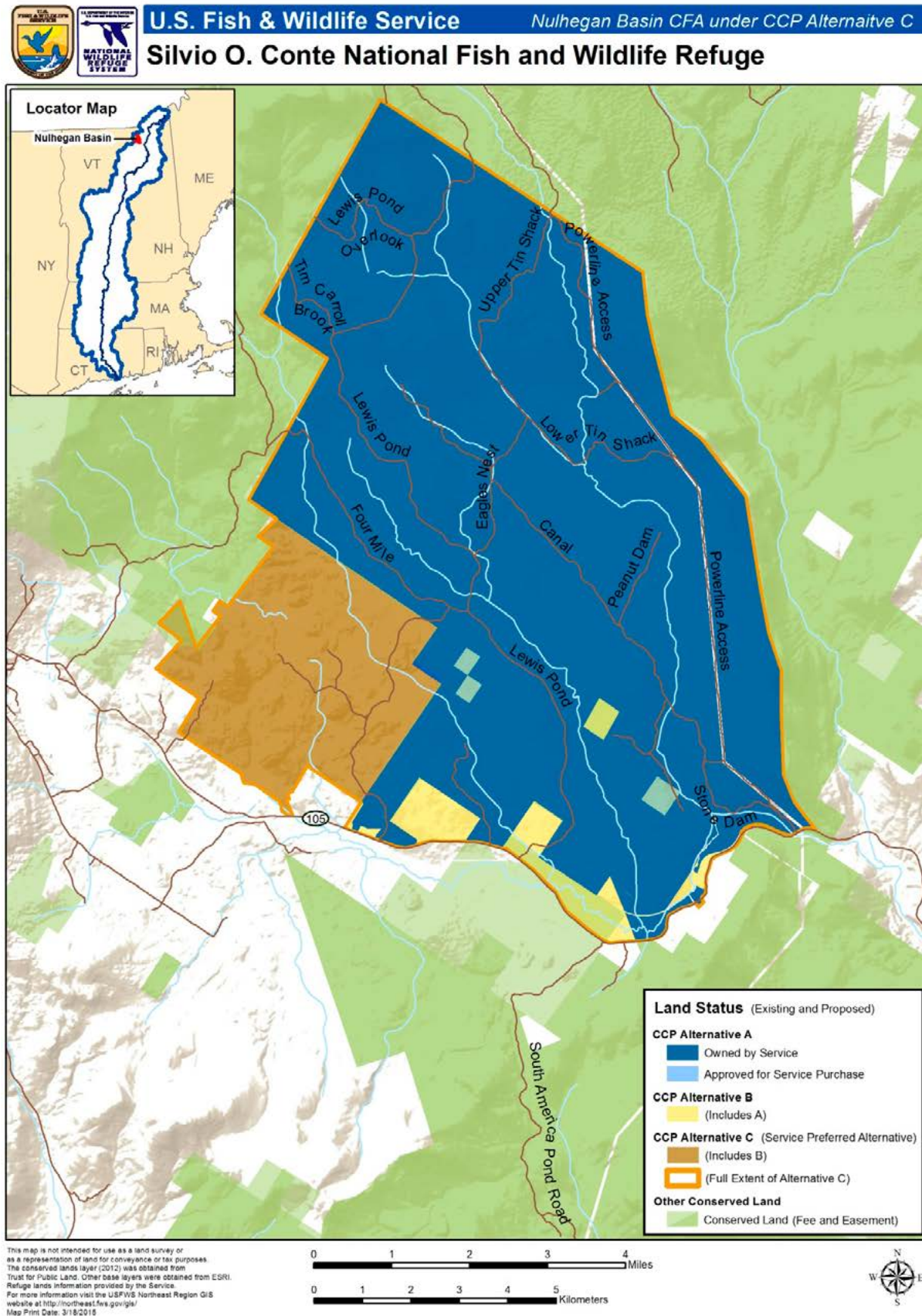
What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

The National Wildlife Refuge System Improvement Act of 1997 identified hunting, fishing, wildlife observation, photography, interpretation, and environmental education as priority, wildlife-dependent uses. As such, these uses would receive priority on refuge lands. The larger Nulhegan Basin has a long history as a valued landscape for hunting and fishing, while in recent years, wildlife observation has increased in popularity. The area is also popular for snowmobiling in the winter. Maps A.56 and A.57 show the proposed public use infrastructure under alternative C.

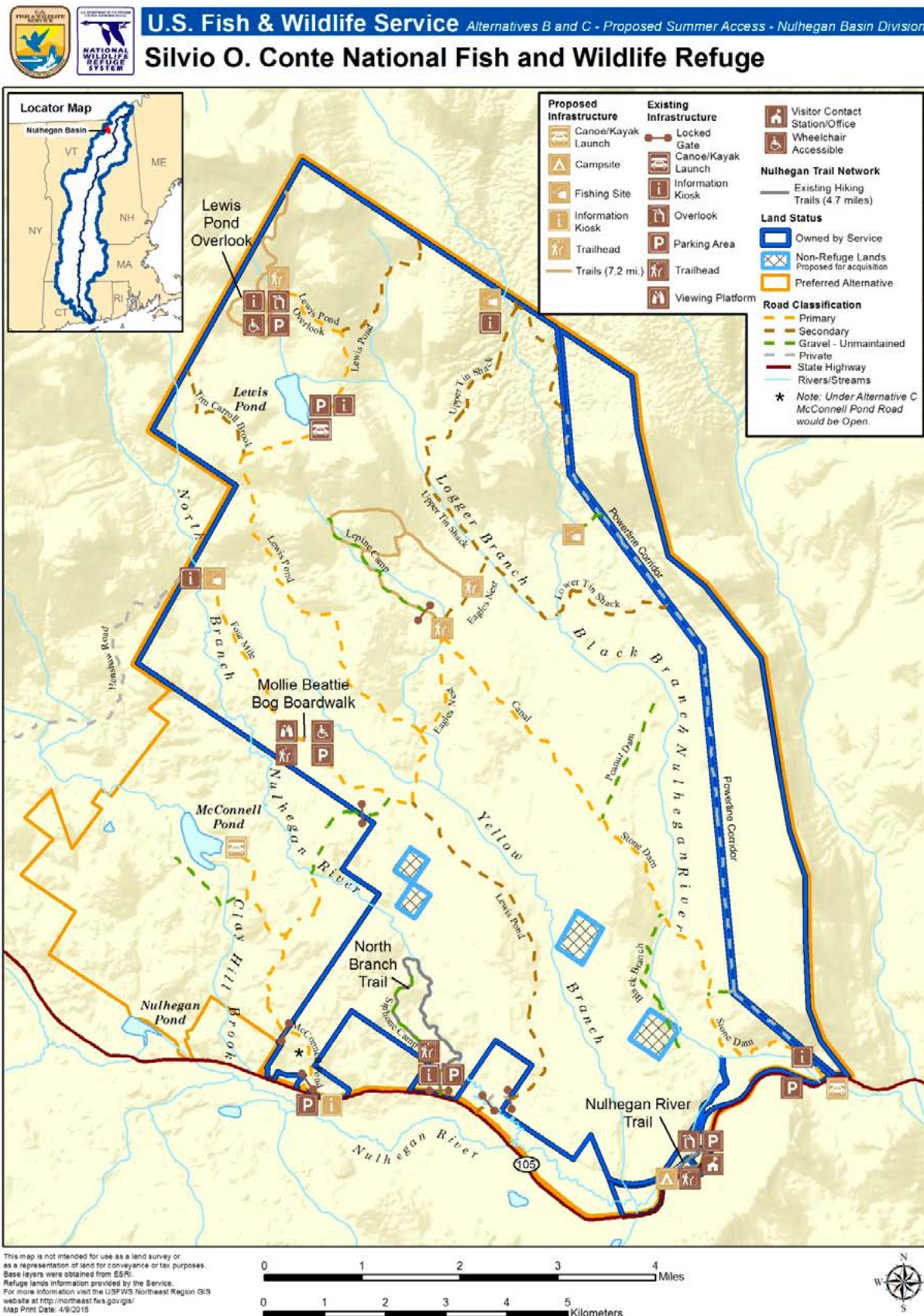
Does the proposed CFA have special ecological, cultural, or recreational features or designation of regional, State, or local importance?

The National Audubon Society recognizes the Nulhegan Basin as an Important Bird Area (IBA) (National Audubon Society 2013). The extensive boreal habitat is home to many rare species, including the State endangered spruce grouse and common loon. Other species found in the IBA include gray jay, Cape May warbler, bay-breasted warbler, boreal chickadee, and black-backed woodpecker.

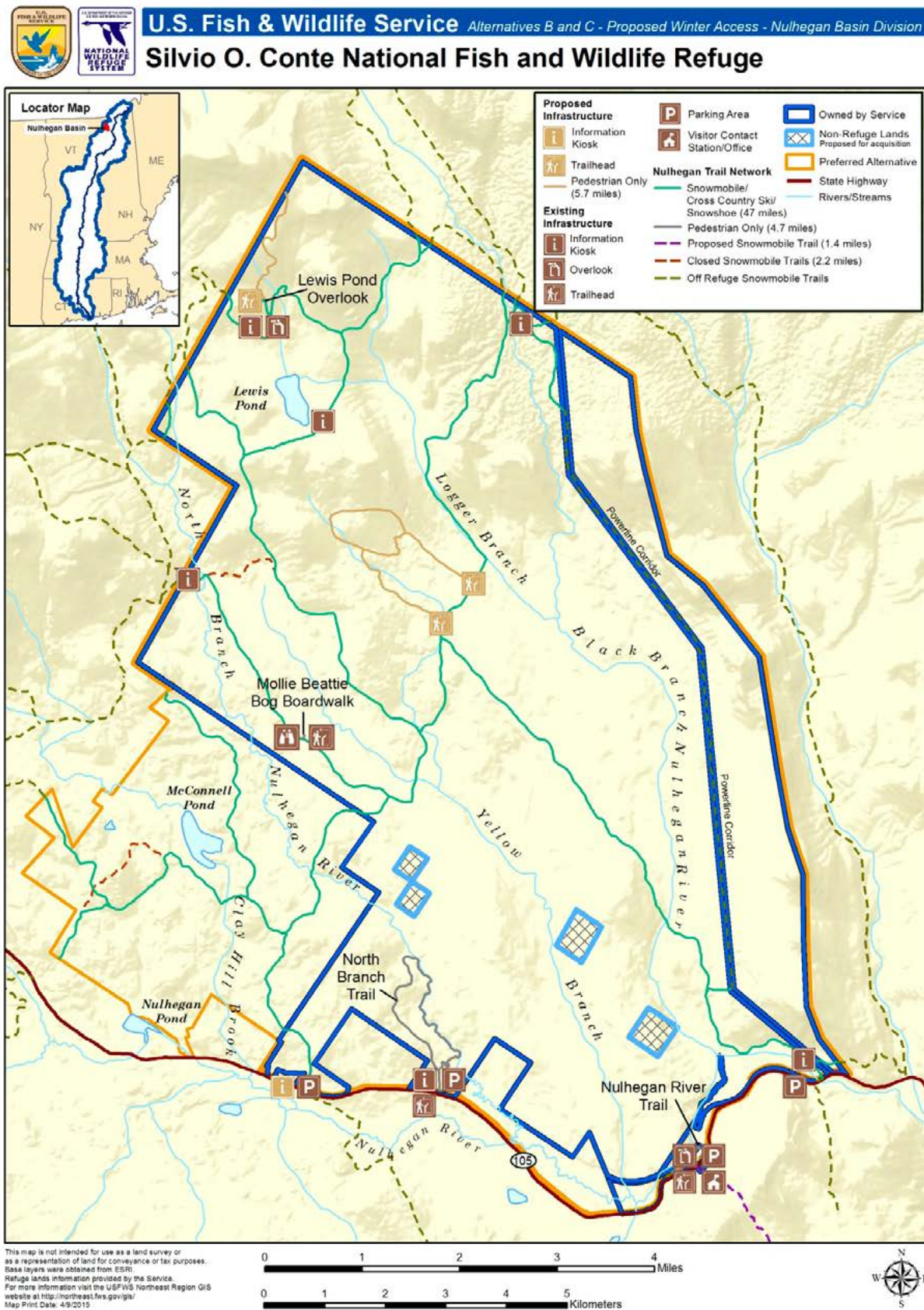
Map A.55. Proposed Nulhegan Basin CFA – Location.



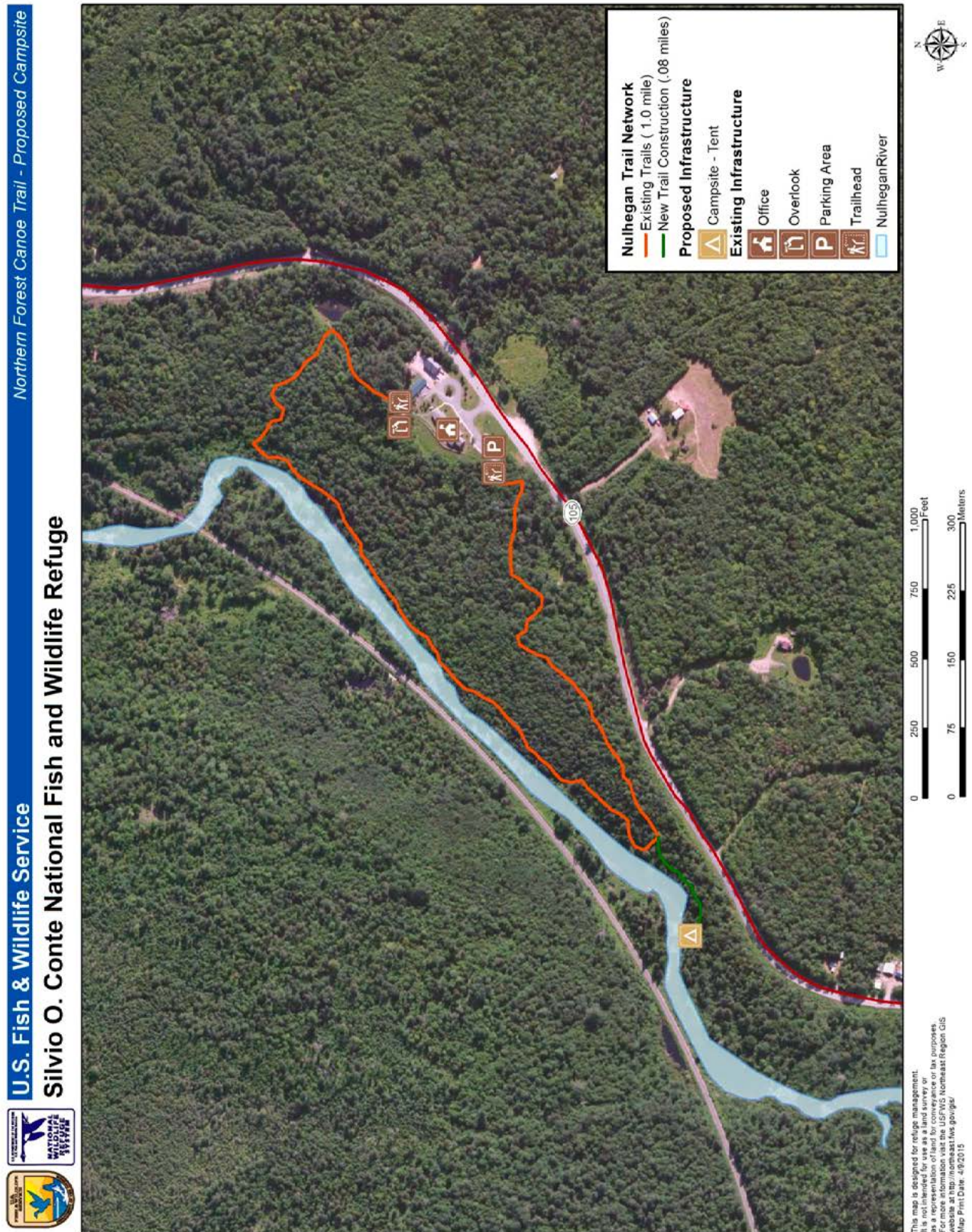
Map A.56. Nulhegan Basin CFA – Proposed Summer Public Access.



Map A.57. Nulhegan Basin CFA – Proposed Winter Public Access.



Map A.58. Proposed Nulhegan Canoe Trail Campsite.



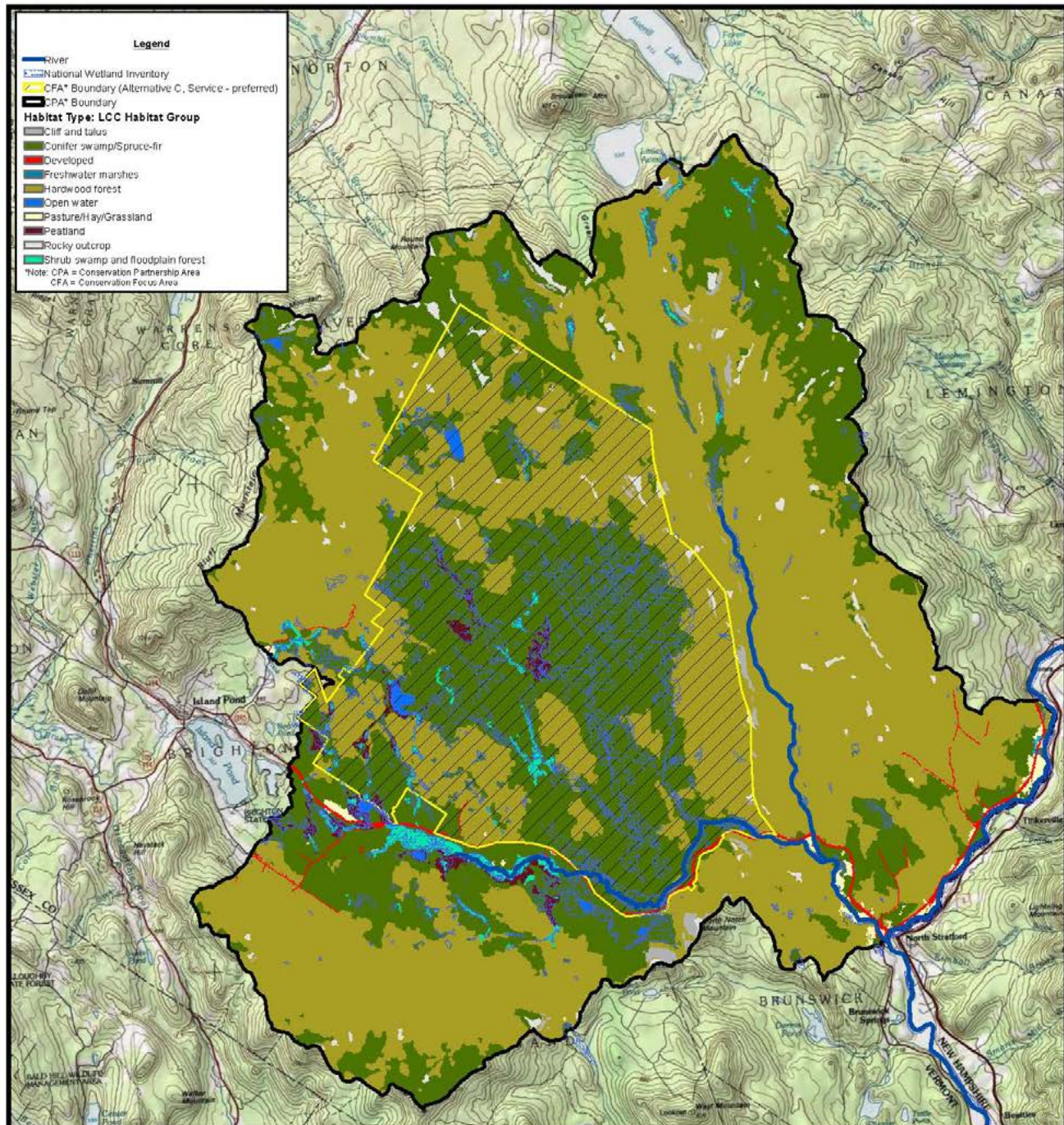
Map A.59. Nulhegan Basin CPA/CFA – Habitat Types.



U.S. Fish & Wildlife Service

Habitat Types: Nulhegan Basin CPA* - VT

Silvio O. Conte National Fish and Wildlife Refuge



This map is designed for refuge management.
It is not intended for use as a land survey or
as a representation of land for conveyance or tax purposes.
For more information visit the USFWS Northeast Region GIS
website at <http://northeast.fws.gov/gis/>
Date: 7/2/2013

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Table A.41. Nulhegan Basin CPA/CFA – Habitat Types.

| LCC General Habitat Type ¹ | CPA ² | | CFA ³ | | | | Percent Habitat ⁸ |
|--|------------------|-----------------------------|------------------|----------------------------------|--------------------------|--------------------------|------------------------------|
| | Total Acres | Percent of CPA ⁴ | Total Acres | Conserved by Others ⁵ | USFWS Owned ⁶ | Percent CFA ⁷ | |
| Forested Uplands and Wetlands ⁹ | | | | | | | |
| Conifer swamp/spruce-fir | 38,154 | 37.9% | 18,549 | 311 | 15,171 | 55.7% | 48.6% |
| Hardwood forest | 57,047 | 56.7% | 13,448 | 10 | 10,713 | 40.4% | 23.6% |
| Shrub swamp and floodplain forest | 1,211 | 1.2% | 348 | 0 | 204 | 1.0% | 28.7% |
| Forested uplands and wetlands subtotal | 96,412 | 95.9% | 32,346 | 322 | 26,088 | 97.1% | 33.5% |
| Non-forested Uplands and Wetlands ⁹ | | | | | | | |
| Cliff and talus | 486 | 0.5% | 40 | 0 | 40 | 0.1% | 8.2% |
| Freshwater marshes | 16 | 0.0% | 4 | 0 | 2 | 0.0% | 23.0% |
| Pasture/hay/grassland | 521 | 0.5% | 2 | 0 | 0 | 0.0% | 0.3% |
| Peatland | 895 | 0.9% | 413 | 0 | 265 | 1.2% | 46.1% |
| Rocky outcrop | 1,176 | 1.2% | 200 | 0 | 200 | 0.6% | 17.0% |
| Non-forested uplands and wetlands subtotal | 3,094 | 3.1% | 658 | 0 | 507 | 2.0% | 21.3% |
| Inland aquatic habitats ⁹ | | | | | | | |
| Open Water | 260 | 0.3% | 163 | 0 | 72 | 0.5% | 62.8% |
| Inland aquatic habitats subtotal | 260 | 0.3% | 163 | 0 | 72 | 0.5% | 62.8% |
| Other | | | | | | | |
| Developed | 777 | 0.8% | 149 | 29 | 74 | 0.4% | 19.2% |
| Other subtotal | 777 | 0.8% | 149 | 29 | 74 | 0.4% | 19.2% |
| TOTAL | 100,543 | 100.0% | 33,317 | 351 | 26,741 | 100.0% | 33.1% |

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Partnership Area

3 - Conservation Focus Area; representing Service - preferred Alternative C

4 - Percentage of the CPA represented by the habitat type

5- Acres in the CFA currently conserved by others (TNC 2012)

6 - Acres in the CFA currently owned by the USFWS

7 - Percentage of the CFA represented by the habitat type

8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C

9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.42. Nulhegan Basin CFA – Priority Resources of Concern.

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|---|---|---|
| Forested Uplands and Wetlands⁴ | | |
| Conifer Swamp/Spruce-fir Forest⁵ - 18,549 acres | | |
| Blackburnian Warbler ^A | Breeding habitat includes mature conifer, and conifer-deciduous forests (80+ years old) (Degraaf et al. 2001, Dunn et al. 1997, Morse 2004). | Cape May Warbler ^{A, J} Boreal Chickadee ^{A, J} Purple Finch ^{A, J} Black-throated Green Warbler ^{A, J} |
| Rusty Blackbird ^{A, C} | Breeding habitat includes conifer dominated forested wetlands interspersed with shrub swamps and peatlands. Young spruce and fir may be required for nesting (Greenland et al, 2010, Powell et al., 2010, and Matsuoka et al, 2010). | Spruce Grouse^{A, I} American Marten^I Canada Lynx ^{I, J} Gray Jay ^{A, I, J} Black-backed Woodpecker ^{A, I, J} Bay-breasted Warbler ^{A, I, J} |
| Canada Warbler ^{A, B, C} | Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997). | White-throated Sparrow Blackpoll Warbler^{A, I} Brown Creeper ^J Northern Saw-whet Owl ^J Olive-sided Flycatcher ^{A, I, J} Palm Warbler ^{A, J} Pine Grosbeak ^{A, J} Sharp-shinned Hawk ^J Yellow-bellied Flycatcher ^J Northern Parula ^A |
| Hardwood Forest⁵ - 13,448 acres | | |
| American Woodcock ^{A, B, C} | Breeding and roosting habitat includes young deciduous and mixed forests (1-20 years old) dominated by aspen and birch, and 3+ acre forest openings with 60% shrub cover, in proximity to alder wetlands and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994). | Ruffed Grouse^{A, I} Whip-poor-will ^{A, I, J} Smooth Green Snake ^I Canada Lynx ^I Chestnut-sided Warbler^{A, I} Purple Finch ^{A, J} Ovenbird^A |
| Black-throated Blue Warbler ^A | Breeding habitat includes mature deciduous and mixed deciduous-conifer forests with a shrubby understory (Degraaf et al. 2001, Hodgman et al. 2000, Dobbs 2007, Dunn et al. 1997) | Eastern Red Bat^I American Redstart ^{A, J} Black-and-white Warbler ^J Broad-winged hawk ^J Eastern Wood-pewee ^{A, J} Northern Flicker ^{A, J} |
| Blackburnian Warbler^A | Breeding habitat includes mature conifer, and conifer-deciduous forests (80+ years old) (Degraaf et al. 2001, Dunn et al. 1997, Morse 2004). | Northern Goshawk ^{A, I, J} Red-shouldered Hawk ^{I, J} Rose-breasted Grosbeak ^{A, J} Canada Warbler ^{A, I} Yellow-bellied Sapsucker ^{A, J} Veery ^{A, I} Black-billed Cuckoo ^{A, I} Black-throated Green Warbler ^A Northern Parula ^A |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|---|--|--|
| Forested Uplands and Wetlands⁴ | | |
| Shrub Swamp and Floodplain Forest⁵ - 348 acres | | |
| American Woodcock ^{A, B, C} | Foraging habitat includes alder dominated wetlands in proximity to early successional forests, shrublands, and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994). | Chestnut-sided Warbler ^{A, I} Black Racer ^I Ruffed Grouse ^{A, I} Warbling Vireo Willow Flycatcher Wood Turtle^I |
| American Black Duck ^{A, B, C, G} | Breeding and migrating habitat includes herbaceous wetlands, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001). | American Redstart ^{A, J} Eastern Kingbird ^J Gray Catbird ^J Wood Duck ^{A, J} Veery ^{A, I} |
| Non-Forested Uplands and Wetlands⁴ | | |
| Rocky Outcrop⁵ - 200 acres | | |
| Northern Appalachian-Acadian rocky heath outcrop ^H Laurentian-Acadian calcareous rocky outcrop ^H | <i>The Northern Appalachian-Acadian rocky heath outcrop system</i> occurs on ridges or summits of erosion-resistant acidic bedrock. The vegetation is patchy, often a mosaic of woodlands and open glades. Red oak and various conifers, including White pine and Red spruce, are characteristic trees. Low heath shrubs, including Sheep laurel, Low-bush blueberry, Black huckleberry, and Black chokeberry are typically present. Exposure and occasional fire are the major factors in keeping the vegetation relatively open. <i>Laurentian-Acadian calcareous rocky outcrop</i> occurs on ridges or summits of circumneutral to calcareous bedrock. Sites are often exposed and dry; however, there may be local areas of more moist conditions. The vegetation is often a mosaic of woodlands and open glades. This system may also occur on rocks that are primarily acidic but with a local influence of calcium through weathering (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|--|--|--|
| Non-Forested Uplands and Wetlands⁴ | | |
| Freshwater Marshes⁵ - 4 acres | | |
| Laurentian-Acadian freshwater marsh ^H | These freshwater emergent and/or submergent marshes are dominated by herbaceous vegetation. They occur in closed or open basins that are generally flat and shallow. They are associated with lakes, ponds, slow-moving streams, and/or impoundments or ditches. The herbaceous vegetation does not persist through the winter. Scattered shrubs are often present and usually total less than 25% cover. Trees are generally absent and, if present, are scattered. The substrate is typically muck over mineral soil. Vegetation includes common bulrush, narrow-leaf cattail, marsh fern, common jewelweed and sedges (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |
| Peatlands - 413 acres | | |
| American Black Duck ^{A, B, C, G} | Breeding and migrating habitat includes herbaceous wetlands, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001). | Olive-sided Flycatcher ^{A, I, J} Southern Bog Lemming ^{I, J} Mink Frog Palm Warbler^A Black-backed Woodpecker ^{A, I, J} Eastern Kingbird ^J Northern Harrier ^{A, I, J} |
| Cliff and Talus⁵ – 40 Acres | | |
| Laurentian-Acadian acidic cliff and talus ^H Laurentian-Acadian calcareous cliff and talus ^H | These cliff systems occur at low to mid elevations, well below treeline. The vegetation within the <i>acidic cliff and talus system</i> is patchy and often sparse, punctuated with patches of small trees such as birches and spruce species. Species that prefer calcium rich soils are absent. In north-facing or other sheltered settings where cold air accumulates at the bottom of slopes, a shrubland of heaths and reindeer lichens can develop. <i>The calcareous cliff and talus system</i> has more nutrient rich soils, and the vegetation is often sparse, but may include patches of small trees including northern white cedar, which may be the dominate species. Ash species and basswood are woody indicators of the enriched setting (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|---|--|--|
| Inland Aquatic Habitats⁴ | | |
| Open Water⁵ - 163 acres | | |
| Brook Trout^{B, F} | Spawning habitat includes clear, well oxygenated cold water lakes/ponds/streams with silt-free rocky substrate, abundant cover, vegetated banks, stable temperatures and stream flow (VTWAP 2005). | Eastern Pearlshell ^I Riffle Snaketail ^I Brook Snaketail ^I Maine Snaketail ^I Zebra Clubtail ^I |
| Atlantic Salmon^{B, E, G} | Spawn in cold freshwater moving streams w/ coarse clean gravel and adequate food/cover. Migrate in large rivers (VTWAP 2005). | |
| American Black Duck^{A, B, C, G} | Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001). | Canada Goose ^A Wood Duck ^A Hooded Merganser ^J Green-winged Teal ^J Mallard ^J Common Merganser Ring-necked Duck Common Loon^{A, I} Osprey ^I |

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

A: 2008 Bird Conservation Region 14.

B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.

C: 2008 USFWS Birds of Conservation Concern.

D: Federal Threatened and Endangered status as of 2010, including Candidate Species

E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010

F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan

G: Silvio O Conte Refuge Purpose Species.

H: 2008 North East Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

A: 2008 Bird Conservation Region 14.

I: 2005 Vermont Wildlife Action Plan (Species of Greatest Conservation Need)

J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Goals, Objectives, and Strategies for Refuge Lands in the Nulhegan Basin CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Spruce-fir Forests)

Improve the diversity of seral stages (where and when possible), restore historic composition and structure, and improve landscape connectivity of spruce-fir habitat to support species of conservation concern and aid in climate change adaptation. Management will provide breeding and foraging habitat for priority refuge resources of concern, including blackburnian warbler, rusty blackbird, and Canada warbler.

Rationale:

There is a greater likelihood of meeting more species' requirements when more varied habitat conditions are present, and thus a higher degree of wildlife diversity can be expected (MacArthur and MacArthur 1961, Hunter Jr. 1990, Askins 2002, DeGraaf et al. 2006). And further, a traditional principle of ecology holds that diverse ecosystems are more stable than ecosystems that are less diverse (Elton 1958). This has important implications for climate change and wildlife conservation.

At the landscape-scale (here defined as the CFA) managing forests for diversity requires managing the patterns of succession that determine the age structure of the landscape. This is important for two reasons: (1) some successional stages have more species than others; and (2) each stage has a different, although not usually unique, set of species. In this discussion we refer to managing the age structure of the landscape, rather than managing succession, because the age of the forest stand is a reasonable index of its successional state.

While much of our forest management will attempt to move the Nulhegan's relatively young spruce-fir forests (majority of the forest is younger than 30-45 years old (Lapin and Engstrom 2002)) toward an older condition, across the CFA spruce-fir forests will contain a variety of patches in different size classes and developmental stages. Species dependent upon disturbances that create early successional forested habitats, like rusty blackbird, are declining as remaining patches of young forest mature (Matsuoka et al. 2010, Powell et al. 2010, C. Foss personal communication). Maintaining stands of young spruce-fir adjacent to wetland areas within the CFA may benefit rusty blackbirds. Enhancing the horizontal structure of spruce-fir forests across the CFA should support other species of conservation concern like bobcat, palm warbler, spruce grouse, and—if wetlands and riparian areas are present—Canada warbler (Lambert et al. 2005, Reitsma et al. 2008, Chace et al. 2009).

Early successional spruce-fir also serves as preferred habitat for snowshoe hare, an important prey species for the Federally-endangered Canada lynx recently documented within the CFA. While we recognize the importance of early successional habitat to Canada lynx, critical habitat for Canada lynx in Vermont has not been designated under the authority of the Endangered Species Act. Further, neither the State of Vermont nor the Service has developed a management plan that evaluates the importance of Vermont for Canada lynx and measures needed to ensure their persistence within the State. Although these planning efforts are not available to inform Canada lynx management needs at the Nulhegan Basin CFA, an evaluation was conducted by the Service's New England Field Office and refuge staff on the importance of the CFA to Canada lynx.

We assume that all elements that are considered essential for supporting breeding Canada lynx are present within the Nulhegan Basin landscape, as evidenced by recent breeding records. Aubry et al. (2000) suggest the average home range for Canada lynx in southern boreal forests, such as those found in Vermont, is approximately 18,000 acres for females and 37,000 acres for males. The Nulhegan Basin CFA is approximately 33,000 acres;

we estimate that the CFA would support no more than two female and one male Canada lynx. Within the larger Nulhegan Basin, we estimate support for no more than 11 female and 5 male Canada lynx. Based on these estimates, we assume the Nulhegan Basin is incapable of supporting a standalone Canada lynx population, and the persistence of Canada lynx in Vermont may be reliant upon receiving periodic dispersal from larger source populations, such as those found in Maine. To ensure that Canada lynx persist in Vermont, it is important that efforts to conserve the species be developed at a landscape scale, since no single landowner is likely to support enough habitat for this species. We will continue to monitor Canada lynx populations in the Nulhegan Basin CFA, and work with adjacent landowners, the VFWD, the New Hampshire Fish and Game Department, and the New England Field Office to develop a lynx management plan for northern Vermont and New Hampshire.

Maintaining diversity across the landscape must include an adequate number and area of old forests simply because they represent one portion of the successional sequence, and especially because they represent what is likely to be the most biologically diverse portion of the sequence (largely due to tree bole users). Areas like the Nulhegan Basin CFA, where natural disturbance regimes are small-scale and relatively uncommon, old forests once dominated the landscape (Lorimer 1977, Bormann and Likens 1979, Cogbill 2000, Fraver et al. 2009). While we are unable to return to a pre-European settlement forest, we can redress some of the imbalance currently within the CFA. Through a combination of silviculture aimed at restoring old-growth characteristics (Keeton 2004, D'Amato and Catanzaro 2007, Bauhus et al. 2009), long rotation systems and unmanaged areas we hope to create an important habitat condition missing from the hardwood and mixed-wood forests of the Nulhegan. By arranging long rotation stands to encircle a core of forests determined to possess late successional characteristics we can buffer these areas, significantly increasing its effective size. These efforts will aid a suite of species that include numerous bat species that require large diameter trees for roosting, barred owls, ovenbirds, and red bats.

Ecologically sustainable management in red spruce-balsam fir forests in the Nulhegan will ideally retain spruce as the dominant species because this long-lived species stabilizes the light environment in the understory, influences the texture and chemistry of forest litter, provides habitat for numerous birds and mammals, and is commercially valuable for timber and pulp. Red spruce appears to be vulnerable to temporary displacement by balsam fir and other fast-growing pioneer species (including red maple, trembling aspen, big-tooth aspen, and paper birch), particularly after stand-replacing disturbances or preferential high-grading and disease (Frank and Bjorkbom 1973, Seymour and Hunter Jr. 1992, Bouchard et al. 2007). Its seeds are short-lived and do not persist in the soil seed bank (Blum 1990). Individual longevity can be longer than 300 years, and is considerably longer than that of balsam fir (about 70 years). Since red spruce is economically valuable for timber and pulp (Seymour 1992), and usually has better health and sizes than balsam fir, it has been harvested repeatedly on the same sites in the Nulhegan Basin since the mid-1800s (Whitney 1996; Cogbill 2000). It has low genetic variability and may lack adaptability to environmental stress including global climate change (DeHayes and Hawley 1992). Red spruce is in documented decline in some parts of its range (Siccama et al. 1982; Adams and Stephenson 1989; Klein et al. 1991; Battles and Fahey 1995). Improving the representation of red spruce in the Nulhegan's spruce-fir stands will provide food and cover for various animals and birds. The spruce grouse feeds on the buds and foliage; red squirrels eat both the buds and seeds; varying hare species browse twigs and foliage; and porcupines feed upon the bark.

Our understanding of the forest structure within Nulhegan Basin comes from a forest-based habitat inventory conducted in 2007 (USFWS unpublished), aerial photo interpretation by contractors and a reading of the forest history within the Nulhegan Basin (Cogbill 2000; Gove 2003). Much of the spruce-fir forest within the Nulhegan Basin CFA was harvested prior to refuge ownership using techniques that produced a structurally homogenous, relatively young forest landscape. This in contrast to a natural disturbance regime within spruce-fir characterized by small-scale disturbances: insect outbreaks (spruce budworm [*Choristoneura fumiferana*] and bark beetles [*Dendroctonus rufipennis*]) and wind storms recurring at intervals of several decades (Lorimer 1977, Seymour 1992). Unlike the commercial clearcuts that dominated softwood management in the Nulhegan, these disturbances are usually not stand replacing, and thus lead to the development of a wider range of age structures. The greater potential diversity in both species composition and age structure offers a broader array of habitats for refuge focal species.

For forest birds, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes at the stand-level, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. Nulhegan Basin's spruce-fir forests should have all forest layers present and distributed throughout a stand and across the landscape: canopy, midstory, understory, and ground layer. Enhanced vertical structure will provide the greatest number of bird species with the greatest number

of nesting and foraging opportunities. Patches of very dense native shrub and understory layers (0 to 5 feet in height) created via group selection silviculture are of particular importance. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like rusty blackbird and black-throated green warblers. Improving vertical diversity of spruce-fir forests during management may provide an important habitat component for blackburnian warblers, who are canopy foragers who preferentially breed in forests with substantial cover taller than 60 feet (18 meters) (Morse 1976).

Dying, dead, and down trees are important components of forest ecosystems, because during the process of death and decay they are inhabited by an extraordinarily diverse succession of organisms ranging from woodpeckers and other cavity-users, to myriad invertebrates, fungi, and microorganisms. While studies examining snags and downed logs specifically in spruce-fir ecosystems are lacking, research in other forest types has shown timber extraction of the sort that impacted the Nulhegan's spruce-fir forests tends to minimize the number of snags and logs in a stand (Goodburn and Lorimer 1998, Fraver et al. 2002, Hura and Crow 2004). Our management efforts will explicitly retain, or where appropriate create, dead wood. Generally, 2-4 large (defined as greater than 14" DBH) snags per acre is thought to be adequate to maintain most wildlife populations.

Extensive and preferential removal of softwood species from the Nulhegan's mixed-wood stands is thought to have reduced the habitat quality of corridors linking large expanses of spruce-fir. Because the problems of forest fragmentation have been documented largely for small patches of forest surrounded by agriculture (REFS), it is not known how relevant these issues are in forested landscapes that have been fragmented by shifted species composition. Nevertheless restoring red spruce, eastern hemlock, and other softwood species to our mixed-wood stands in proportions closer to historical norms, will improve these corridors for species that may move between patches of spruce-fir forest, including white-tailed deer and American marten.

Management Strategies:

Within 5 years of CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure.
- Evaluate hydrologic regime to inform restoration efforts.
- Identify forest stands where management is necessary to improve species composition.
- Use forest management treatments (commercial and non-commercial) where and when appropriate to improve habitat. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Work with partners, including the State in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.
- Ensure this habitat type provides effective winter shelter for wintering deer.
- Participate in the North Atlantic Landscape Conservation Cooperative efforts to develop climate change vulnerability assessment models.
- Work with partners and the USFWS New England Field Office to develop a lynx management plan for northern Vermont and New Hampshire, and evaluate the importance and role of habitats in the Nulhegan Basin CFA to lynx populations in the southern boreal forest.

Within 10 years of CCP approval:

- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Promote stands dominated by early seral stages where appropriate to support nesting Canada warbler, rusty blackbirds, and Canada lynx.
- Promote stands dominated by late seral stages in the CFA interior to support blackburnian warbler,

including consideration of a refuge-designated “natural area” free from management actions.

- In managed stands, promote increased compositional and structural heterogeneity, including dense canopies, large-diameter trees, and large-diameter coarse woody debris and snags.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Continue to monitor Canada lynx populations in the CFA. For example, monitor Canada lynx with telemetry to determine home ranges, den sites, and other information.
- Map vernal pools and seeps.

Within 10 years of CCP approval:

- Conduct wildlife and habitat surveys to monitor temporal changes and trends resulting from management actions.

Sub-objective 1.1b. (Hardwood Forests)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure for the diversity of species present, including American woodcock, black-throated blue warbler, and blackburnian warbler.

Rationale:

Again, there is a greater likelihood of meeting more species’ requirements when more varied habitat conditions are present, and thus a higher degree of wildlife diversity can be expected (MacArthur and MacArthur 1961, Hunter Jr. 1990, Askins 2002, DeGraaf et al. 2006). And further, a traditional principle of ecology holds that diverse ecosystems are more stable than ecosystems that are less diverse (Elton 1958). This has important implications for climate change and wildlife conservation.

At the landscape-scale (here defined as the CFA) managing forests for diversity requires managing the patterns of succession that determine the age structure of the landscape. This is important for two reasons: (1) some successional stages have more species than others; and (2) each stage has a different, although not usually unique, set of species. In this discussion we refer to managing the age structure of the landscape, rather than managing succession, because the age of the forest stand is a reasonable index of its successional state.

Much of our forest management in our hardwood and mixed-wood stands will attempt to move the Nulhegan’s forests toward an older condition. Biologists and managers have long recognized the ability of silviculture to create wildlife habitat structures (Tubbs 1977, DeGraaf et al. 1989), and more recent work has shown silviculture can create or accelerate the creation of late successional traits in northern hardwood forests (Keeton 2006, McKenny et al. 2006, D’Amato and Catanzaro 2009). While this will represent the largest proportion of our silviculture, we envision the hardwood forests within the CFA will include a variety of patches in different size classes and developmental stages. Species dependent upon disturbances that create early successional forested habitats, like American woodcock and Canada warbler, are declining as remaining patches of young forest mature (Askins 2001, Hallworth et al. 2008). Maintaining stands of young hardwood and mixed-wood forests adjacent to wetland areas have been shown to be important breeding habitat for Canada warbler (Hagan et al. 1997, Lambert and Faccio 2005). Enhancing the horizontal structure of hardwood and mixed-wood forests across the CFA should support other species of conservation concern like chestnut-sided warbler, American woodcock, black and white warbler and—if wetlands and riparian areas are in close proximity—Canada warbler (Lambert et al. 2005, DeGraaf et al. 2006, Reitsma et al. 2008, Chace et al. 2009).

Early successional hardwood and mixed-wood forest also serves as preferred habitat for American woodcock, a species in decline throughout the Connecticut River watershed. The Nulhegan Basin CFA is home to an approximately 260 acre Woodcock Management Demonstration Area. The American woodcock uses particular seral stages of northern hardwood forests, including younger stands dominated by shade-intolerant species like birch and aspen. Woodcock require diverse structural habitat conditions within close proximity of each other: clearings for courtship, forest openings with sparse shrub or herbaceous cover for roosting, young hardwood forests of shade intolerant tree species for nesting and brood rearing, and functional foraging areas (Sepik et al. 1994, Kelley et al. 2008).

Maintaining diversity across the landscape must include an adequate number and area of old forests simply because they represent one portion of the successional sequence, and especially because they represent what is likely to be the most biologically diverse portion of the sequence (largely due to tree bole users). Areas like the Nulhegan Basin CFA, where natural disturbance regimes are small-scale and relatively uncommon, old forests once dominated the landscape (Lorimer 1977, Bormann and Likens 1979, Cogbill 2000, Fraver et al. 2009). While we cannot return to a pre-European settlement forest, we can redress some of the imbalance currently within the CFA. Through a combination of silviculture aimed at restoring old-growth characteristics (Keeton 2004, D'Amato and Catanzaro 2007, Bauhus et al. 2009), long rotation systems and unmanaged areas we hope to create an important habitat condition missing from the spruce-fir forests of the Nulhegan. For example, we've identified approximately 189 patches of older spruce-fir forests (closed canopy of trees approximately 40 years old) ranging in size from <5 acres to more than 60 acres (Lapin and Engstrom 2002). By arranging long rotation stands to encircle a core of forests determined to possess late successional characteristics we can buffer these areas, significantly increasing its effective size. These efforts will aid a suite of species that include northern parula, bay-breasted warbler, black-backed woodpeckers, American martens, white-tailed deer, and boreal chickadees.

Ecologically sustainable management in northern hardwood and mixed-wood forests in the Nulhegan will ideally retain shade intolerants as the dominant species, and reduce the commonality of red maple in both broad forest types. Favoring shade tolerant, long-lived species like sugar maple and red spruce helps to stabilize the light environment in the understory, influence the texture and chemistry of forest litter, and provide habitat for numerous birds and mammals. The Nulhegan's red spruce appear to be vulnerable to temporary displacement by balsam fir and other fast-growing pioneer species (including red maple, trembling aspen, big-tooth aspen, and paper birch), particularly after preferential high-grading and disease (Frank and Bjorkbom 1973, Seymour and Hunter Jr. 1992, Bouchard et al. 2007). Its seeds are short-lived and do not persist in the soil seed bank (Blum 1990), making ascendancy to the canopy often dependent upon advanced regeneration. Individual longevity can be longer than 300 years, and is considerably longer than that of balsam fir (about 70 years). Red spruce is in documented decline in some parts of its range (Siccama et al. 1982; Adams and Stephenson 1989; Klein et al. 1991; Battles and Fahey 1995). Improving the representation of red spruce in the Nulhegan's mixed-wood stands will provide food and cover for various animals and birds. The spruce grouse feeds on the buds and foliage; red squirrels eat both the buds and seeds; varying hare species browse twigs and foliage; and porcupines feed upon the bark.

Our understanding of the forest structure within Nulhegan Basin comes from a forest-based habitat inventory conducted in 2007 (USFWS unpublished), aerial photo interpretation by contractors and a reading of the forest history within the Nulhegan Basin (Cogbill 2000; Gove 2003). Most of the hardwood and mixed-wood forests within the Nulhegan Basin CFA were harvested prior to refuge ownership using a combination of clearcutting and high-grading, resulting in a structurally homogenous, relatively young forest landscape. This in contrast to a natural disturbance regime characterized by catastrophic wind and ice storms, including hurricanes and cyclonic storms, thunderstorms, derechos, and tornados (Lorimer and White 2003). Unlike much of the forest management that has occurred within the CFA, these disturbances are usually not stand replacing, and thus lead to the development of a wider range of age structures. The greater potential diversity in both species composition and age structure offers a broader array of habitats for refuge focal species.

For forest birds, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes at the stand-level, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. Nulhegan Basin's hardwood and mixed-wood forests should have all forest layers present and distributed throughout a stand and across the landscape: canopy, midstory, understory, and ground layer. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of nesting and foraging opportunities. Patches of very dense native shrub and understory layers (0 to 5 feet in height) created via group selection silviculture are of particular importance. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like Canada warbler and black-throated blue warbler. The black-throated blue warbler, prefers continuous tracts of mature forests dominated by deciduous tree species; a moderately open canopy; and a moderate to dense shrub layer (Morse 1994, Dunn and Garrett 1997, DeGraaf and Yamasaki 2001). Improving the diversity in canopy layers of hardwood and mixed-wood forests during management may provide an important habitat component for blackburnian warblers, who are canopy foragers who preferentially breed in forests with substantial cover taller than 60 feet (18 meters) (Morse 1976). Blackburnian warblers are one of six NALCC representative species for northern hardwoods. The Nulhegan Basin CFA falls within Bird Conservation Region 14, and supports 32 percent of the global population of black-throated blue warblers, making their conservation a priority.

Dying, dead, and down trees are important components of forest ecosystems, because during the process of death and decay they are inhabited by an extraordinarily diverse succession of organisms ranging from woodpeckers and other cavity-users, to myriad invertebrates, fungi, and microorganisms. Studies examining snags and downed logs specifically in hardwood and mixed-wood communities has shown timber extraction of the sort that impacted the Nulhegan's forests tends to minimize the number of snags and logs in a stand (Goodburn and Lorimer 1998, Fraver et al. 2002, Hura and Crow 2004). Our management efforts will explicit retain, or where appropriate create, dead wood. Generally, 2-4 large (defined as greater than 20" DBH) snags per acre is thought to be adequate to maintain most wildlife populations.

Extensive and preferential removal of softwood species from the Nulhegan's mixed-wood stands is thought to have reduced the habitat quality of corridors linking large expanses of spruce-fir. Because the problems of forest fragmentation have been documented largely for small patches of forest surrounded by agriculture or suburban development (Gates and Gysel 1978, Wilcove 1985, Fahrig 2003), it is not known how relevant these issues are in forested landscapes that have been fragmented by shifted species composition. Nevertheless restoring red spruce, eastern hemlock, and other softwood species to our mixed-wood stands in proportions closer to historical norms, will improve these corridors for species that may move between patches of spruce-fir forest, including white-tailed deer and American marten.

Management Strategies:

Within 5 years of CCP approval:

- Manage Woodcock Demonstration Management Units (WDMU) following the WDMU Plan.
- Use forest management treatments (commercial and non-commercial) where and when appropriate to improve habitat. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.

Within 10 years of CCP approval:

- In managed stands, promote increased compositional and structural heterogeneity, including large-diameter coarse woody debris and snags.
- Stands with late seral characteristics should be conserved wherever they exist, and restored where appropriate within the CFA.
- Use management techniques that emulate natural ecological disturbances (e.g., single tree mortality in late seral stands).
- Enhance representation of more uncommon species, such as yellow birch and eastern hemlock, and conserve as much American beech as possible.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Map vernal pools and seeps.

Within 10 years of CCP approval:

- Conduct wildlife and habitat surveys to monitor temporal changes and trends resulting from management actions.

Sub-objective 1.1c. (Shrub Swamps and Floodplain Forest)

Manage shrub swamp and floodplain forest communities to support natural and rare ecological communities, and provide foraging habitat for priority refuge resources of concern including American woodcock and American black duck. Priority will be to maintain the alder-dominated shrub swamps within the woodcock management units.

Rationale:

Shrub swamps are restricted to poorly drained areas, small seepage zones, and wide alluvial stretches of rivers and small streams. Shrubs tend to dominate the wetland, though grasses may be present. Typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush (Gawler 2008). These wetlands are also created through beaver activity, a natural and important disturbance process within the Nulhegan Basin. The landscape mosaic of flooded areas and ponds in various stages of succession provide a diversity of plant communities, and habitats for a variety of wildlife species, including American woodcock and American black duck, priority refuge resources of concern.

American woodcock are dependent on early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like American woodcock, are declining as remaining patches of young forest mature. Woodcock require varying habitat conditions that are within close proximity of each other, including clearings for courtship, forest openings with sparse shrub or herbaceous cover for roosting, young deciduous forests of shade intolerant tree species for nesting and brood-rearing, and functional foraging areas (Sepik et al. 1994, Kelley et al. 2008). Shrub swamps in the CFA provide moist, rich soils for foraging and the dense shrubs provide cover from predators.

The woodcock management units in the CFA are being managed to provide the mosaic of habitat conditions that woodcock require. Management of the shrub swamp communities may be required to maintain shrub dominance and stem densities. Tree species, such as red maple, tend to replace mature shrub species and established invasive plants compete for nutrients and space. These invading species require management in order to maintain the native shrub diversity of the community. A high shrub stem density is also important as it provides birds with cover from predators and more leaf surface area for gleaning. Cover for American woodcock, for example, is ideal in a 10-15 year old shrub swamp (USDA 2001). Shrub species, in particular alder, tend to die back as they reach maturity, and as a result stem density decreases. Periodic rejuvenation of shrubs is necessary to maintain required stem densities. Management priority will be given to shrub swamps that are part of the CFA woodcock management areas. Management of these shrub swamps will benefit other species that use these communities, including willow flycatcher, American redstart, chestnut-sided warbler, ruffed grouse, black racer, and eastern ribbon snake.

American black ducks also use shrub swamp communities, though black ducks prefer shrub swamps that are flooded or adjacent to open water habitats. Black ducks rely on these wetlands during the breeding season and as stopover habitat during migration. Adults and their broods forage on seeds, aquatic vegetation and invertebrates in flooded shrub swamp communities, or adjacent open water habitats. Adults place well-concealed nests in the vicinity of foraging habitat in nearby uplands or dry hummocks in the wetland (Longcore et al. 2000, DeGraaf and Yamasaki 2001). American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 14. Protecting and managing these shrub wetland communities from potential threats, including invasive species introduction, altered hydrology, and fragmentation, will contribute to the conservation of this species.

Management Strategies:

Within 5 years of CCP approval:

- Manage WDMU following the WDMU Plan.
- Create and maintain alder in suitable density and size class to provide quality foraging habitat for American woodcock.
- Manage non-native plant species.
- Assess hydrology of wetland communities, evaluate impacts, and prioritize restoration opportunities.
- Manage beaver created shrub wetlands that provide brood habitat through annual modifications to the beaver trapping program.
- Protect rare or exemplary natural communities.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:*Within 5 years of CCP approval:*

- Monitor American black duck productivity, and use of shrub wetlands.

Objective 1.2: Non-forested Uplands and Wetlands**Sub-objective 1.2a. (Peatlands)**

Manage peatland communities to support natural and rare ecological communities, and provide breeding and foraging habitat for priority refuge resources of concern including American black duck.

Rationale:

Peatland communities in the Nulhegan Basin CFA occur at the lower elevations. The groundcover in these peatland communities is dominated by sphagnum moss, and the vegetation is semi-treed or dominated by low shrubs, such as sheep laurel and Labrador tea. Sedges and grasses are common in the understory (Gawler 2008). There are several treed bogs in the Nulhegan Basin CFA, including the 75 acre Mollie Beattie Bog, which is among the most significant black spruce bogs in Vermont.

The peatlands that surround McConnell Pond, and those that occur along slow moving streams, including the Yellow Branch of the Nulhegan River, may provide important breeding and foraging habitat for American black duck, and other waterfowl species such as wood duck, mallards, and hooded mergansers. Wetland habitats, such as peatlands, are used by black ducks for breeding and foraging. Well-concealed nests are placed on the ground in adjacent uplands or dry hummocks in the wetland, and adult ducks and their broods forage on seeds and herbaceous vegetation of sedges, rushes, and submerged aquatic plants, as well as invertebrates (Longcore et al. 2000, DeGraaf and Yamasaki 2001).

American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 14. Protecting and managing these peatland wetland communities from potential threats, including invasive species introduction, and altered hydrology will contribute to the conservation of this species.

Management Strategies:*Within 5 years of land acquisition and CCP approval:*

- Minimize refuge activities that disturb wetland communities.
- Protect rare or exemplary natural communities.

Inventory and Monitoring Strategies:*Within 5 years of CCP approval:*

- Inventory wetland plant communities, and evaluate wetland hydrology for potential impacts to the natural flow regimes.
- Continue to survey wildlife use of wetlands.

Sub-objective 1.2b. (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can

be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The biological integrity, diversity, and environmental health (BIDEH) policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Nulhegan Basin CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (i.e., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water Habitat)

In collaboration with partners, manage water resources and riparian areas to provide cold temperature regimes, substrate diversity, and unimpeded aquatic species passage that benefit priority refuge resources of concern including Eastern brook trout and Atlantic salmon. Also provide undisturbed breeding and foraging habitat for American black duck, and other waterfowl species.

Rationale:

The Nulhegan River and three of its four major tributaries— the North, Yellow, and Black branches—flow through the Nulhegan Basin CFA. These cold water rivers provide important habitat for brook trout and Atlantic salmon. Both of these species are a high priority for conservation for the State and the Service’s Northeast Region. Native brook trout populations are also present in Lewis and McConnell Ponds within the CFA.

Since the late 1800s, timber harvesting and associated activities have impacted riparian habitats within the Nulhegan Basin CFA. Rivers were reshaped; trees removed from river banks, and constructed logging roads impeded aquatic species passage. A change in stream habitat characteristics resulted, impacting fish populations. The refuge, Trout Unlimited, and the VFWD recognize the importance of restoring, protecting, and maintaining populations and habitats of brook trout and other aquatic species of concern. Efforts are underway to assess current habitat conditions, and prioritize restoration efforts.

VFWD also have concerns with the introduction and recruitment of smallmouth bass into Lewis Pond. Smallmouth bass prey on brook trout, and inventories have determined that brook trout populations are decreasing, while smallmouth bass populations are on the rise. Monitoring of Lewis Pond fish populations will continue, and appropriate management actions will be determined.

McConnell and Lewis Ponds, and the surrounding wetland habitats, are also important breeding and foraging areas for waterfowl species. Mergansers, wood ducks, mallards and black ducks forage on invertebrates and aquatic vegetation in backwater areas, and adjacent wetlands. Common loons are often found feeding on small fish in Lewis Pond, though breeding has not been confirmed.

Management Strategies:

Within 5 years of CCP approval:

- Continue to support partners in performing stream assessments to evaluate physical, chemical, and biological condition of the Nulhegan Basin Division’s fish community structure, productivity, and health; and support in-stream habitat restoration efforts.
- Continue to support partners in performing stream assessments to identify man-made physical barriers (impassable road crossings, culverts and dams) to movement of fish and other aquatic organisms, implement a remediation plan of identified obstacles to aquatic species passage. Work with partners to identify and replace undersized culverts important to the restoration of aquatic organism passage.
- In coordination with VFWD, develop and implement a plan for elimination of the non-native smallmouth bass in Lewis Pond.

Within 10 years of CCP approval:

- Develop a plan for protection or restoration of native races of brook trout in North Branch, Yellow, and Black Branches of Nulhegan River.
- Develop and implement a plan for remediation and enhancement of stream morphology (instream habitat) in support of brook trout and Atlantic salmon populations (e.g., recruitment of large woody debris).

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Perform habitat surveys and quantification of potential spawning and nursery habitat for Atlantic salmon in the Nulhegan River North, Yellow, and Black Branches.

Within 10 years of CCP approval:

- Assess status of brook trout populations, including genetic characteristics, in all waters of the Nulhegan Basin Division.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not applicable to the Nulhegan Basin CFA

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not applicable to the Nulhegan Basin CFA

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Work with communities, school systems, public and non-profit organizations, and private educational organizations to develop quality model environmental education curricula and to recruit and develop individuals to conduct high quality environmental education at the Nulhegan Basin Division. Priority will be given to programs for those residents within the communities local to the Nulhegan Basin Division, including, but not limited to Bloomfield, Brunswick, Ferdinand, and Brighton, VT, and North Stratford, NH. Further priority will be given to participants within a 1-hour commute of the division. Environmental education programs will be designed to:

- Take into account the needs of the target audience, as well as the relevance to the target audience's everyday lives.
- Be student and community-centered.
- Be curriculum-based, with goals and measurable objectives.
- Be inquiry driven and involve direct experiences with nature.
- Involve educators in the development and implementation.
- Be linked to multiple relevant learning standards.
- Coordinate with state and private environmental education programs.
- Relate to refuge management goals, objectives, and purposes.
- Have tools for evaluation and measurable outcomes throughout development and execution.
- Involve repeated contact with the same students.

- Be sustainable (i.e., have the resources necessary to continue over the long term).
- Involve interactions that occur in the natural, the built/developed, and the social environment.
- Aim to develop awareness, attitudes, understanding, skills, and feelings of empowerment.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Because the Nulhegan Basin Division does not have full time visitor services staff, environmental education efforts must be conducted through volunteers, Friends members, and partners.

Management Strategies:

Within 5 years of CCP approval:

- Design or adapt curricula for the Nulhegan Basin Division that focuses on watersheds, on local habitats, and on local natural and cultural resources. Curricula will:
 - ✓ Incorporate multiple relevant learning standards.
 - ✓ Coordinate with existing state and national environmental education programs.
 - ✓ Take into account student and teacher needs.
 - ✓ Be refuge- and/or place-based.
 - ✓ Incorporate nationally recognized education initiatives, when appropriate.
 - ✓ Be designed with specific goals and objectives.
 - ✓ Promote refuge purposes.
 - ✓ Contain consistent interpretive messages and themes.
 - ✓ Promote other refuge divisions and partner-conserved lands and facilities such as state wildlife management areas and parks, science museums, and nature centers as environmental education resources.
 - ✓ Incorporate nationally recognized initiatives (e.g., North American Association of Environmental Education (NAAEE), and Science, Technology, Engineering, and Math (STEM)).
 - ✓ Incorporate national based curricula (e.g., Project WILD, Project Aquatic WILD, Project WET, Flying Wild, and Project Learning Tree).
- Identify and strive to engage non-traditional audiences regarding environmental education opportunities.
- Support the Service's initiatives with regards to environmental education.
- Promote the Nulhegan Basin Division as a destination for field trips and increase the number of students by two percent per year for the next five years.
- Provide support for curriculum-based programs such as Scouts, 4H, Boys and Girls Clubs, Road Scholar (former ElderHostel program), etc.
- Support state environmental education programs (e.g., Hunter and Angler Education, Furbearer Education, Becoming a Great Outdoors Woman, etc.)

- Keep current with state-of-the-art technologies and incorporate them into environmental education programming.
- Work with academic institutions to create issue-oriented experiential activities and programs for use at the Nulhegan Basin Division.

Within 10 years of CCP approval:

- Offer the Nulhegan Basin Division as an outdoor classroom.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Develop an evaluation system to assess the effectiveness of all environmental education curricula.

Sub-objective 2.1b. (Environmental Education Delivery)

In collaboration with other government agencies, non-profit organizations, private educational organizations, staff, volunteers, and members of the Friends of the Nulhegan, offer high quality environmental education programs at the Nulhegan Basin Division, at partner lands and facilities, and at schools in Essex County, VT, and Coos County, NH. The refuge will seek to:

- Facilitate partnerships between local schools within a maximum 1-hour commute of the Nulhegan Basin Division, such as Brighton Elementary and North Stratford School and private environmental education providers to offer experiential refuge programming to these audiences multiple times per year.
- Facilitate the use of refuge and partner lands by educator-led classes.
- Work with local environmental education providers to implement the refuge's Adopt-a-Habitat initiative to help schools and individuals learn about and connect with natural features their local environments.

Rationale:

See rationale for sub-objective 2.1a.

Management Strategies:

Within 5 years of CCP approval:

- Facilitate partnerships between local schools, such as Brighton Elementary and North Stratford School, and private environmental education providers to offer experiential refuge programming to these audiences multiple times per year.
- Use staff, volunteers, and members of the Friends Group to facilitate teachers and students at the Nulhegan Basin Division. The intention is to host up to 10 classes the first year and increase the number of students by 2 percent per year for the next 5 years.
- Promote partner lands and facilities as outdoor classrooms; help deliver priority educational programs at those partner facilities.
- Actively support and recruit partners that seek funding for watershed-based environmental education.
- Allow commercial guiding for the purposes of environmental education, pursuant to the conditions of a special use permit.

Within 10 years of CCP approval:

- Formalize cooperative relationships with environmental education providers through development of agreements and MOUs.
- Develop more detailed environmental education objectives and strategies as part of a Visitor Services Plan.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Formally evaluate the quality of existing environmental education program and as a result of evaluation, plan for the next 5 years.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

Work with communities, public and non-profit organizations, private individuals and for-profit organizations, staff, volunteers, and members of Friends groups to offer quality interpretive programming at the Nulhegan Basin Division.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an expansive road network and multiple trails on site, and a rich natural, cultural, and geologic history, the Nulhegan Basin Division is well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the habitats and cultural resources found on the property. Interpreting the stories about these resources in an effective manner is an important responsibility for the Service. Maps A.56 and A.57 show the existing and proposed public use trails on the division.

Management Strategies:

Within 5 years of CCP approval:

- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.
- Collaborate with partners to create meaningful, consistent, thematic statements to be used in the delivery of programming at the Nulhegan Basin Division.
- Offer opportunities for commercially available interpretive guiding through the special use permit process.
- Develop more detailed interpretive objectives and strategies as part of a Visitor Services Plan.
- Develop a core set of interpretive programs that can be modified on an as needed basis.
- Provide resources and trainings to refuge staff, Friends, and volunteers in support of interpretive programs.

Within 10 years of CCP approval:

- Develop self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Establish relationships with tribes and local historical societies to incorporate cultural history into interpretive programs.
- Make Certified Interpretive Guide (NAI) training available once every other year for refuge personnel, Friends Group members and the general public, with priority given to refuge affiliates.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Build a process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with partners to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Management Strategies:

Within 5 years of CCP approval:

- Through cooperative agreements with local organizations, annually provide quality interpretive programs at refuge facilities and properties.
- Initiate a “refuge host” program, or utilize SCA interns and volunteers to provide personal contacts at the visitor contact station to initiate discussion and answer questions, at least between Memorial Day and Labor Day.
- Incorporate thematic statements, measureable objectives, and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge Web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures (e.g., general brochure and bird checklist that incorporate refuge interpretive messages and themes).
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of CCP approval:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Evaluate the effectiveness of interpretive materials/programs.

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Sub-objective 2.3a. (Local Residents, Community Leaders, and Elected Officials)

Through effective outreach, the refuge will work to increase public awareness of the benefits of Nulhegan Basin Division within the surrounding communities. Individuals will become aware of public offerings, resources, and programs offered at the Nulhegan Basin Division, and of the interpretive messages of the Silvio O. Conte National Fish and Wildlife Refuge.

Rationale:

Strategic, quality outreach targeted at specific audiences is vital to communicate with individuals about watershed and refuge concerns, to work toward a shared vision for the Connecticut River watershed and to gain support for refuge activities. Nulhegan Basin Division lands were originally part of a much larger holding of industrial timber lands. Therefore, in addition to a differing land management philosophy, there are also some activities once allowed that have changed due to safety considerations, natural resource concerns, as well as, overall compliance with Refuge System regulations. As a result of that history, many local residents and long-time users are curious about possible changes and future planning for the area. It is critically important to keep people informed of all management and recreational activities occurring and proposed for Nulhegan Basin Division lands and to keep communication open to prevent misunderstandings.

Management Strategies:

Continue to:

- Prepare an annual summary of activities at the division and circulate to local governments, elected officials, partner organizations, and post for the general public.

- Continue to nurture a relationship with Brighton and Maidstone State Parks related to the cross-promotion of each facility's public offerings.

Within 5 years of CCP approval:

- Maintain good lines of communication with refuge neighbors and community leaders.
- Develop consistent outreach messages.
- Attend select board/board of governors and Chamber of Commerce meetings, and visit town clerks, planners and other elected officials as needed to keep them apprised of refuge issues and projects.
- Host open houses to introduce residents and local officials to the refuge.
- Provide refuge publications, posters, and other outreach materials to interested businesses and partner facilities in northern Essex County, whose customers may have an interest in refuge offerings.
- Write issue driven outreach plans to keep elected officials informed of refuge and partner accomplishments and of issues within the larger watershed that have possible impacts to the refuge.
- Proactively schedule consistent meetings with elected officials to share and update each other on constituent concerns and opportunities.
- Develop messages and actions that describe the division's benefits to the local community. Examples include: environmental education and interpretation programming, special events hosted for the community, employment for local youth through Youth Conservation Corps (YCC), mutual aid agreements, etc.
- Develop Conte Corners at the welcome centers in Island Pond and St. Johnsbury, Vermont.

Within 10 years of CCP approval:

- Develop and implement an outreach plan for communicating with area residents about the importance of this area to the larger watershed and describe how they can contribute to improving watershed quality. Possible components would include demonstration sites, behind-the-scene tours, special open houses, and technical publications.

Sub-objective 2.3b. (State and National-level Elected Officials)

Through effective outreach to Congress and State officials, as needed, the refuge will work to increase awareness of the benefits of Nulhegan Basin Division and the Silvio O. Conte National Fish and Wildlife Refuge.

Rationale:

See rationale for sub-objective 2.3a.

Management Strategies:

Within 5 years of CCP approval:

- Provide briefings to members of Congress and state officials, or their staff as needed or as requested.

Within 10 years of CCP approval:

- Monitor and evaluate the need for future outreach efforts.

Sub-objective 2.3c. (Media)

Through effective outreach to the media, the refuge will work to increase public awareness of the Nulhegan Basin Division and the Silvio O. Conte National Fish and Wildlife Refuge within the surrounding communities. Individuals will become aware of public offerings, resources, and programs offered at the Nulhegan Basin Division, and of the interpretive messages of the Silvio O. Conte National Fish and Wildlife Refuge.

Rationale:

See rationale for sub-objective 2.3a.

Management Strategies:

Within 5 years of CCP approval:

- Write press releases detailing large refuge projects and accomplishments, and the joint efforts and accomplishments of the refuge and refuge partners.
- Develop and implement an outreach plan that uses state of the art technology to disseminate program information and division offerings to the public.
- Host local media representatives at the Nulhegan Basin Division.
- Routinely use community-based outreach methods, such as newspapers and local access television to publicize refuge events and run public service programming on environmental issues.

Within 10 years of CCP approval:

- Monitor and evaluate the need for future outreach efforts.

Sub-objective 2.3d. (Greater Watershed Community)

Through effective outreach, the refuge will work to increase public awareness of the Nulhegan Basin Division and the Silvio O. Conte National Fish and Wildlife Refuge within the greater watershed communities. Individuals will become aware of public offerings, resources, and programs offered at the Nulhegan Basin Division, and of the interpretive messages of the Silvio O. Conte National Fish and Wildlife Refuge.

Rationale:

See rationale for sub-objective 2.3a.

Management Strategies:

Within 5 years of CCP approval:

- Encourage landowners to take advantage of cooperative land management programs available through the Service and other agencies such as Natural Resources Conservation Service (NRCS) as a way of enhancing environmental quality on and around the refuge.
- Draft annual reports that introduce residents to the refuge, describe refuge accomplishments, detail visitor opportunities, and discuss refuge operations and current and future refuge projects.
- Implement an Adopt-a-Habitat program to be used in part as an outreach tool for schools and community residents to learn about and become stewards of their local environment.
- Promote the refuge as a destination for recreation, interpretation, and environmental education opportunities.
- Promote refuge lands for special events such as National Wildlife Refuge Week, International Migratory Bird Day, Earth Day, etc.
- Use the WoW Express as an outreach tool to connect with audiences throughout the watershed at fairs, festivals, etc.
- Support the Friends of the Nulhegan.
- Provide outreach materials at partners' facilities.
- Promote cooperation with partners for the use of facilities, programs, and staff when conducting outreach.

Within 10 years of CCP approval:

- Produce conservation messages that reach a wide range of audiences through a variety of media (e.g., print, broadcast, social media).
- With partners, explore communication strategies to reach targeted audiences with common messages.

- Sponsor at least one Bio Blitz on refuge lands in each state, and ultimately in each division/or local community in conjunction with Adopt-a-Habitat program.
- Monitor and evaluate the need for future outreach efforts.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Sub-objective 2.4a. (Institutions of Higher Learning and Other Partners)

Develop relationships with institutions of higher learning and other partners conducting conservation research relevant to the Division's focal species such as the University of Vermont and Lyndon State College, and private organizations, such as the Vermont Institute of Natural Science and Vermont Center for Eco-studies and encourage their use of refuge lands for wildlife-related research. Take advantage of partners' scientific based resources and enlist partners in Strategic Habitat Conservation and other resource protection activities.

Rationale:

One of the six legislative purposes guiding the establishment of the Silvio O. Conte National Fish and Wildlife Refuge is "to provide opportunities for scientific research, environmental education, and fish and wildlife-oriented recreation and access to the extent compatible with other purposes . . ." The Nulhegan Basin Division is actively managed and roughly one hour from Lyndon State College, while the University of Vermont is two hours away. The abundance of natural and cultural resources in the local area makes the Nulhegan Basin Division a key resource for students looking for mentoring experiences, and for students looking to conduct research projects relating to conservation, wildlife management, resource protection, and human dimensions. Similarly, student research will benefit the refuge by answering management questions, and helping to guide management strategies.

Management Strategies:

Continue to:

- Work with partners to conduct research relevant to refuge management issues.
- Support the Northern Forest Land Management Research Demonstration (LMRD) project by actively participating in planning efforts and implementing appropriate land treatment efforts.
- Implement the American woodcock habitat demonstration project.

Within 5 years of CCP approval:

- Formulate a list of important natural resource research questions of management importance to the Division and Northern Forest and share them with colleges and universities as possible graduate and undergraduate research projects.
- Develop formal agreements with Cooperative Wildlife Research Units, universities, and other partners to answer the Conte Refuge's most critical research needs.
- In collaboration with the Friends of Conte, seek funding for high priority research.

Within 10 years of CCP approval:

- Support the development of new appropriate research projects on refuge lands, as well as continue to support current research projects on refuge lands. See chapter 3 in the draft CCP/EIS for a description of current research projects.
- Identify opportunities for LMRD projects on lands adjoining the Division.
- Promote refuge lands to universities and other partners as a location for conservation and cultural resource-related research.

Sub-objective 2.4b. (Technology and Information Exchange)

Participate, coordinate, and/or host professional conferences, workshops and seminars related to wildlife biology, wildlife management, environmental education and interpretation at the Nulhegan Basin Division.

Rationale:

See rationale for sub-objective 2.4a.

Management Strategies:

Within 5 years of CCP approval:

- Encourage staff to participate in relevant, natural and cultural resource conferences that will contribute to making good decisions.
- Distribute 'lessons learned' from refuge management to interested parties.
- Provide inventory and monitoring summaries through the refuge Web site.

Within 10 years of CCP approval:

- Sponsor/host science based conferences as opportunities arise.

Sub-objective 2.4c. (Mentoring)

Provide quality mentoring opportunities for local students and interested individuals.

Rationale:

See rationale for sub-objective 2.4a.

Management Strategies:

Continue to:

- Host a YCC crew and spend staff time with members informing them of refuge job duties and career options within the Service.

Within 5 years of CCP approval:

- Offer student internships and host field trips.
- Offer to periodically present refuge and career information to classes at local high schools and colleges.
- Seek opportunities to participate in student workshops, trainings, and events.

Within 10 years of CCP approval

- Develop a mentoring program to work with students to help them identify their career goals and introduce career paths within the Service.
- Participate in undergraduate and graduate level classes at local universities and colleges, presenting information on various topics and issues of importance to the refuge.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and which provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

The Nulhegan Basin Division's lands are open to the public 24 hours a day, 7 days a week. A network of snowmobile trails provides winter access. The road network is gated to wheeled vehicles during spring mud season, which usually lasts from mid-April through late May. During this time, only pedestrian access is allowed.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access, and Infrastructure)

Provide the opportunity for a quality hunting experience following State- and refuge division-specific regulations.

Rationale:

Hunting is allowed on national wildlife refuges, as long as it is found to be a compatible use. The Nulhegan Basin Division has been a popular area for hunters extending back for generations. The refuge lands are especially prized for the opportunities to hunt American woodcock, ruffed grouse, snowshoe hare, moose, and white-tailed deer. Some of these species, especially woodcock, grouse, and moose, are hunted by residents as well as, non-residents, many of whom travel to the area from other northeastern states, while white-tailed deer, grouse, and snowshoe hare are more sought after by local residents and the camp leaseholders and their friends who maintain cabins both on the refuge and surrounding lands. Hunting guides can aid the local economy and enhance a users' experience, especially for those individuals from outside the immediate area. Refer to Appendix D, "Findings of Appropriateness and Compatibility Determinations," for additional details on how the use would be allowed.

Management Strategies:

Continue to:

- Allow hunting based on VFWD regulations and the following division-specific regulations:
 - ✓ Shooting across, over, or within 10 feet of the traveled portion of any gravel road is prohibited.
 - ✓ Temporary blinds are permitted, but must have the owner's name and address visible on the blind.
 - ✓ All decoys, shell casings, and other personal equipment and refuse must be removed from the refuge at the end of each day.
 - ✓ We allow the use of retrieving dogs, but dogs must be under voice command at all times.
 - ✓ We prohibit the use of all-terrain vehicles (ATVs or OHVs).
 - ✓ The use or possession of alcoholic beverages while hunting is prohibited.
 - ✓ Nighttime raccoon hunting with dogs requires a special use permit.

Within 1 year of CCP approval:

- Update the refuge-specific CFR regulations to clarify that the prohibition on shooting across "the traveled portion of any gravel road" only applies to roads that are contemporaneously open to motor vehicles.
- Update the refuge-specific CFR regulations to note that any nighttime hunting will require a special use permit.
- Maintain a contact list of those individuals training and/or hunting with pursuit hounds (bobcat, bear, coyote) on the refuge, as well as those training beagles in order to share information regarding the identification of lynx and their sign and proper conduct when lynx are present (e.g., leashing and removing hounds from the area) as well as a means to contact users immediately should critical information become available (e.g., the discovery of a lynx den).
- Request that the VFWD promote hunting by featuring refuge opportunities in their annual hunting and fishing digest; also use the digest to describe any refuge-specific regulations.
- Ensure any necessary safety zone (i.e., no hunting zone) around the division's headquarters and visitor contact station are clearly marked on refuge brochures, hunt maps, and signs.

- Post newly acquired properties to ensure refuge boundary lines are clearly marked.

Within 5 years of CCP approval:

- Complete hunting opening package to formally open newly acquired lands to hunting, consistent with compatibility determinations.
- Work with the VFWD to determine whether opportunities exist for state-recognized disabled hunters, and if so, identify potentially new infrastructure needs.
- Mow 1 mile of former logging haul road annually to provide enhanced hunter access.
- Mow roadside “pullouts” on a 2 to 3 year rotation to allow enhanced hunter access.
- Offer opportunities for commercial hunting guides to operate on the division through the issuance of a special use permit.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Work with VFWD to evaluate the effectiveness and success of the refuge hunt program in contributing to State population objectives.
- Develop a system to monitor and evaluate the hunting program; involve hunters and other users in collecting feedback; determine whether refuge management objectives are being met; and allow for adaptive management.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide State-sponsored hunter education classes access to the Nulhegan Basin Division. Conduct directed outreach to ensure hunters are informed about refuge-specific regulations, hunter ethics, and safety considerations. Develop programs, including brochures, web pages, media releases, etc.

Rationale:

Hunting is a priority public use that can also serve as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience. The division’s visitor contact station and its surrounding grounds provide an ideal setting for this type of instruction. In addition, the meeting space and grounds can also be used for complete onsite archery programs, directed by volunteers, with staff support.

Management Strategies:

Continue to:

- Work with VFWD to inform hunters of the field identification differences between bobcat and federally threatened Canada lynx, and ruffed grouse (i.e., partridge) and the State-endangered spruce grouse with flyers at division kiosks, the refuge Web site, etc.
- Offer to host VFWD-sponsored hunter education courses at the division’s visitor contact station.

Within 1 year of CCP approval:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge Web site, at Nulhegan Basin Division informational kiosks, through the Friends of the Nulhegan, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of CCP approval:

- Work with VFWD to encourage youth hunting at the division as a means of introducing young people to hunting.
- Offer division facilities and staff to guide and support volunteer “Becoming a Bowhunter”- type programs.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America’s natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access, and Infrastructure)

Provide quality fishing opportunities at the Nulhegan Basin Division. Complete all administrative procedures to officially open refuge lands to fishing, based on VFWD regulations, and any division-specific conditions.

Rationale:

Fishing is a priority public use on national wildlife refuges and a popular outdoor recreational activity. The division has been open to fishing since establishment and we propose to continue to offer this use. Although fishing is not as popular as hunting or wildlife observation at the Nulhegan Basin Division, there are opportunities for visitors to fish Lewis Pond and the Black and North Branches of the Nulhegan River. Fishing guides can aid the local economy and enhance a users’ experience, especially for those individuals from outside the immediate area. Most anglers seek out brook, brown, and rainbow trout, although Lewis Pond had been stocked illicitly with smallmouth bass in the past. Each year, the VFWD stocks Lewis Pond with roughly 2,000 fall fingerling brook trout and the Black Branch of the Nulhegan River with approximately 100 yearling brook trout. They also stock the main stem Nulhegan River with 100 yearling brook trout, which can easily make their way into the refuge. Map A.52 shows proposed fishing access points.

Management Strategies:

Continue to:

- Provide the opportunity for a quality fishing experience on ponds, rivers, and streams at the Nulhegan Basin Division, wherever feasible.

Within 1 year of CCP approval:

- Complete all administrative requirements to maintain fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Publicize the access and fishing opportunities provided to anglers via the newly opened North Branch Trail.
- Open newly acquired lands to fishing, consistent with the final approved compatibility determination.

Within 5 years of CCP approval:

- Work with the VFWD to develop additional fishing access points for the North and Black Branches.
- Work with VFWD to explore restoring a native cold-water trout fishery to Lewis Pond, including outreach to camp leaseholders and visitors about the consequences of introducing bass. Any pond-wide reclamation effort involving the use of chemicals would adhere to all Service, Federal, and State environmental regulations.
- Offer opportunities for commercial fishing guides to operate on the division through the issuance of a special use permit.
- Assess user interest in an ADA-compliant fishing access site at Lewis Pond or McConnell Pond (subject to Service acquisition).

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Develop a system to monitor and evaluate the fishing program; involve anglers and other users in collecting feedback; determine whether refuge management objectives are being met; and allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, Web site pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Both the VFWD and Trout Unlimited are important partners. Opportunities exist to work with both of these entities to develop a closer link to the neighboring communities with fishing by creating fishing maps and publications and hosting fly-tying, fly-casting, or other fishing-related seminars at the visitor contact station.

Management Strategies:

Continue to:

- Offer the visitor contact station as a site to host fly-tying and other fishing-related seminars. Focus on expanding efforts to engage women and children.

Within 1 year of CCP approval:

- Inform the VFWD and private partners of the availability of the visitor contact station to host a “Take Me Fishing” event.
- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available on the refuge website, at informational kiosks, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Within 5 years of CCP approval:

- Work with the VFWD and Trout Unlimited to highlight the native brook trout fishery on the division.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography at the Nulhegan Basin Division by maintaining existing and proposed trails and parking areas, watercraft launch sites, tour routes, and commercially guided activities, as compatible.

Rationale:

Wildlife viewing and photography is a priority public use on national wildlife refuges and a popular recreational activity at the Nulhegan Basin Division. The division’s landscape is vast, with nearly unlimited wildlife viewing opportunities, although unlike many refuges, its formal infrastructure is both limited and rustic. Moose is perhaps the single most desired animal for wildlife viewing. The division also hosts nearly 100 species of nesting birds, principally, forest-dependent songbirds, and the woods are alive with their songs during the May—June breeding season. In particular, experienced bird watchers are drawn to the Nulhegan Basin Division for the opportunity to view four boreal species typically found much further north: spruce grouse, black-backed woodpecker, gray jay, and boreal chickadee. Currently, visitors can travel the nearly 40 miles of gravel roads, five miles of developed hiking trail, and dozens of miles of old logging roads to pursue wildlife observation and photography opportunities.

User groups with an existing presence in the area requested certain infrastructure additions, such as a hiking trail originating at the Lewis Pond Overlook, a riverside campsite on the Nulhegan River below the visitor contact station, and a canoe/kayak launch at the junction of the Nulhegan River and Route 105. In all cases, these

improvements build on and encourage use of existing infrastructure, provide additional visitor opportunities to observe and experience wildlife in a variety of forms, and offer a means to connect varied audiences with the refuge and National Wildlife Refuge System. In addition, three rustic fishing access sites, consisting of a signpost and footpath, are proposed as a means of showing visitors with little knowledge of the division, potential fishing locations. A rustic “backcountry” trail loop is proposed as a means of incorporating existing logging haul roads into a trail without the amenities found on the other division trails, thereby providing a slightly different experience for bird watchers and as an access point for hunters. Lastly, if the McConnell Pond tract is acquired as proposed, the road leading to McConnell Pond will be opened to the public and maintained as a primary road, and a car top boat launch will be established.

Management Strategies:

Continue to:

- Allow wildlife observation and photography throughout the Nulhegan Basin Division.
- Maintain the current visitor infrastructure including the Nulhegan River Trail, North Branch Trail, Mollie Beattie Bog Boardwalk, Headquarters Overlook, Lewis Pond Overlook, kiosks, and parking areas.
- Invest a majority of our road maintenance funds in our principal road network (Stone Dam, Canal, Eagle’s Nest, Upper Lewis Pond, Lewis Pond Overlook, and Four Mile Roads), such that they are accessible to a wide range of visitors, including those with passenger cars and trucks.
- Support Northeast Kingdom Audubon’s public bird watching trips.

Within 1 year of CCP approval:

- As an enhancement to the visitor experience and as an aid to the local economy, allow for professionally guided wildlife tours, subject to compatibility and a special use permit.
- Allow photography blinds on the division that do not negatively impact wildlife behavior. Blinds must be removed each day, unless arrangements have been made via special use permit.

Within 5 years of CCP approval:

- Construct a 1.3 mile native surface loop trail (0.5 miles of which is existing, cleared trail) with its trailhead at the Lewis Pond Overlook. The trail will be built to the “rustic” standards found elsewhere on the surrounding publicly accessible lands, with minimal vegetation clearing.
- If interest exists, convert 4.2 miles of primarily former logging roads to a “back country” trail that is minimally maintained (i.e., native surface, no structural improvement, only vegetation trimming), and have limited signage.
- Offer opportunities for commercial wildlife observation guides to operate on the division through the issuance of a special use permit.

Within 15 years of CCP approval:

- Evaluate feasibility of providing safe motor vehicle access from McConnell Pond Road (if acquired by the Service) to serve as a second, direct access point to the division. This will require sufficient funding to rebuild one to two miles of road and construct a new bridge.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Develop a system to monitor and evaluate the wildlife observation and photography program on the refuge.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people that visit the division. Work closely with the Friends of Nulhegan and other partners who host events designed to view wildlife on the division.

Rationale:

The entire division is available for wildlife observation and photography. A modest amount of printed and electronic observation and photography aids currently exist, but such materials can be expanded to include a wider range of wildlife and habitats. Whenever possible, we will try to use new technologies to help enhance viewing opportunities on the refuge (e.g., online materials, social media sites, applications for mobile devices). Unfortunately, much of this is dependent on cell phone coverage, which is poor within the division. Should service improve in the next decade, this can be a valuable tool for informing the public across a large landscape in a self-directed way.

Management Strategies:

Continue to:

- Provide the Nulhegan Basin Division bird guide at kiosks, the visitor contact station, and on the refuge Web site.

Within 5 years of CCP approval:

- Create additional species guides, such as guides for butterflies and moths, amphibians, and mammals. Include a map within the guides that identifies “hotspots” where viewing opportunities are more likely and also encompass varied habitat types. Make these guides available at kiosks, the visitor contact station, and on the refuge Web site. Explore the feasibility of using social media to distribute species lists.
- Support wildlife observation events led by partners, organizations including International Migratory Bird Day, Big Sit, etc.

Within 10 years of CCP approval:

- Explore the feasibility of using cell phone technology to advance a users’ experience, such as phone applications, QR codes, or calling codes that would enable visitors to learn about various natural features while on the division.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Develop compatible opportunities on Nulhegan Basin Division that promote state and watershed-wide initiatives that facilitate wildlife observation and photography, such as the Connecticut River Birding Trail and state roadside wildlife viewing areas, and which raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

The Nulhegan Basin Division’s visitor contact station hosts more than 4,500 visitors annually. Many of these visitors are from outside the local area and are looking for accessible wildlife viewing opportunities.

Management Strategies:

Continue to:

- Promote the Connecticut River Birding Trail by emphasizing the Nulhegan Basin Division as one of the featured locations and by making the guides available at the visitor contact station.

Within 1 year of CCP approval:

- Make guides and published materials supporting the Connecticut River Byway and the Connecticut River Blueway available at the visitor contact station.

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities)

Develop compatible opportunities on the Nulhegan Basin Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

The division benefits directly with the Nulhegan River's inclusion in the Northern Forest Canoe Trail, a 740-mile water trail from upstate New York to Maine. Hundreds use the trail each year; some are "through" paddlers, while others paddle shorter sections of less than a day to several days. The division has the opportunity to connect with this user group by making the visitor contact station and the division's other resources available to them. Map A.58 shows the proposed Northern Forest Canoe Trail campsite and a proposed canoe/kayak launch site on the division.

The Connecticut River Paddlers' Trail passes through Bloomfield, Vermont, six miles from the visitor contact station. This is a relatively new initiative with the ambitious goal of creating a formal water trail, with launching areas and campsites for the 410-mile length of the Connecticut River. There are benefits to partnering with this organization given the likely overlap in user groups.

Management Strategies:

Within 1 year of CCP approval:

- Support the Northern Forest Canoe Trail and Connecticut River Paddlers' Trail by offering their literature to the public at the visitor contact station.
- Allow the Northern Forest Canoe Trail to construct canoe/kayak launching and landing sites (floating log ladder or stone water-land transition area) on the Nulhegan River:
 - (1) Below the visitor contact station to support access to a proposed campsite.
 - (2) At the Nulhegan River/Route 105 crossing near Stone Dam Road to formalize an existing launching site adjacent to a state-maintained parking area. In addition to construction and on-going maintenance, the Northern Forest Canoe Trail would be responsible for obtaining any necessary permits.
- Allow the Northern Forest Canoe Trail to construct a primitive campsite and 500-foot native surface trail linkage from the Nulhegan River Trail to support long-distance paddlers and to establish a physical link between the water trail and the refuge via its visitor contact station. The campsite will include a cleared space for up to two tents, a picnic table, and a privy. The Northern Forest Canoe Trail's local river steward will be responsible for site maintenance. Refer to Appendix D, "Findings of Appropriateness and Compatibility Determinations," for additional details regarding use of the campsite.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities)

Develop compatible opportunities on the Nulhegan Basin Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

The Nulhegan Basin Division's size, road network, and proximity to regional trails present several opportunities to link with other existing land-based trails. The division is an important "hub" within the Vermont Association of Snow Travelers (VAST) snowmobile trail network in northern Essex County. Snowmobiling in this area preceded establishment of the division and continues to be a significant means of allowing the public access to the division's resources during a quarter of the year. Although snowmobiling accounts for the greatest amount of public use, the visitor contact station is only lightly used during winter; such use could increase significantly provided a connection to the trail network is established. The division's lands also offers connections to regional hiking and potentially, equestrian trails. Map A.57 shows the proposed snowmobiling network on the division.

Management Strategies:

Continue to:

- Work with VAST to maintain and operate a snowmobile trail system on the division that provides opportunities to experience the division's habitats and wildlife, while also retaining important trail connections across the larger network. Virtually all of this network will overlay existing gravel roads. A 35 mph speed limit will be enforced. Refer to Appendix D, "Findings of Appropriateness and Compatibility Determinations," for additional details on how the use would be allowed.

Within 1 year of CCP approval:

- Allow VAST to construct an access trail to the visitor contact station, so that the thousands of annual snowmobilers will benefit from the exhibits and other services available at the contact station. This would entail building a 1.4-mile spur primarily across Plum Creek Timber Company lands and would therefore require the approval of Plum Creek and the Vermont Land Trust. Less than 500 feet of the new trail would occur on refuge land.
- ✓ In order to compensate for the proposed 1.4 miles of new trail construction, approximately 2.0 miles of existing trail segments will be closed:
 - * Trail 114 between EX27 and EX271 (0.9 miles of “winter” or “grass” road) and approximately 1.1 miles of secondary trail C102/114 between EX22 and EX32 (one-half of a small loop) on the McConnell Pond tract (if acquired by the Service).
 - * Such closures will only be implemented if and when the proposed new trail is completed and open to the public.
- Open snowmobile trails to pedestrian uses, such as snowshoeing and cross-country skiing, as is similar to adjacent public lands.
- Partner with the Green Mountain Club to construct a 1.4-mile hiking trail segment to incorporate the division into their Gore Mountain Trail. This trail would originate at the Lewis Pond Overlook parking area and much of it would occur on Plum Creek Timber Company lands and would therefore require the approval of Plum Creek and the Vermont Land Trust. It will be built to a standard similar to other regional hiking trails, with a mineral soil tread and minimal vegetation clearing.

Within 5 years of CCP approval:

- If acquired by the Service, formalize a portion of the VAST network on the McConnell Pond tract as part of the established refuge network, subject to the compatibility determination findings.

Within 15 years of CCP approval:

- Evaluate whether refuge lands can form a continuous connection with the established equestrian trail on West Mountain Wildlife Management Area. If found appropriate and compatible, a portion of the division’s gravel road network would be incorporated into the larger trail system.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Allow compatible outdoor recreational opportunities on the Nulhegan Basin Division that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division. Maps A.56 and A.57 show the proposed public use infrastructure on the division.

Management Strategies:

Continue to:

- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Allow hiking both on and off the developed trail network.
- Allow occupancy and use of private recreational cabins on existing division lands subject to the terms of the established special use permit.

Within 1 year of CCP approval:

- When compatible, allow commercial guiding in support of priority public uses by special use permit.

- Allow snowshoeing and cross-country skiing everywhere on the division, including the VAST snowmobile network.
- Allow bicycling on the formal gravel road network (i.e., those named roads available to motor vehicle travel) during the snow-free season.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.

Within 5 years of CCP approval:

- Work with the Friends of Nulhegan to design and promote a virtual geocache course that integrates orienteering with refuge interpretive messages and that links the Nulhegan Basin Division to other refuge divisions.
- If the Service acquires the McConnell Pond tract, establish a special use permit for administration of any private recreational cabins acquired along with the tract. Similar to existing cabins on the division, those cabins occurring on the McConnell Pond tract will follow the same special use permit conditions (refer to appendix D) and leases will also terminate no later than July 21, 2049, pending negotiations with the current landowner.

Overview Ompompanoosuc Conservation Focus Area (Proposed)

Vershire, Fairlee, and West Fairlee, Vermont

| Conservation Focus Area (CFA)—Acreage Profile | Acres | Percentage of CFA |
|--|--------|-------------------|
| Total CFA Acres to be Conserved by Service | 15,071 | 98.0 % |
| ■ Existing Refuge Ownership in CFA ¹ | 0 | |
| ■ Additional Acres in CFA proposed for Refuge Acquisition ² | 15,071 | |
| Existing Acres in CFA Permanently Conserved by Others ^{2,3} | 312 | 2.0 % |
| Total Acres in CFA ^{2,4} | 15,383 | 100 % |

¹Acres from Service's Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

The proposed Ompompanoosuc CFA is part of a larger high priority area for the State of Vermont because it is a relatively large, contiguous, block of northern hardwood forest and its importance to interior forest birds. There are several nearby conserved lands, including the Bradford and Fairlee Town Forests. However, the area is currently largely unconserved and Service land acquisition in the area could help fill this gap. Also, the proposed CFA is expected to be resilient to climate change.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Hardwood Forest – 86.4%
- Shrub Swamps and Floodplain Forest – 0.8%
- Freshwater Marsh – 0.6%

See map A.61 and table A.43 for more detailed habitat information for the CFA.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.44 below, there are fourteen Priority Refuge Resources of Concern (PRRC) terrestrial and aquatic species that may rely upon the diverse habitats in this CFA. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. The refuge will seek to protect and restore (if necessary) these habitat types. Additionally, we recognize the value of this area to various documented State Species of Greatest Conservation Need (SGCN), and to species that require large contiguous forest tracts such as forest interior dwelling bird species. These species and others are discussed further below.

1. Migratory Birds

The Connecticut River watershed is a major migration corridor for bird species. The lower portion of the watershed (CT and MA), and habitats along the main stem, receive higher use by migrating landbirds. As birds move north, they disperse beyond the Connecticut River main stem, becoming more evenly distributed in habitats across the watershed (Smith College 2006). The Ompompanoosuc CFA not only provides important stopover habitat for migrating landbirds, but breeding habitat as well.

This CFA is mostly forested, the topography steep in places, with elevations rising above 2,200 feet. The cliff and talus systems are used by nesting peregrine falcons, a Priority Refuge Resource of Conservation Concern and State Species of Greatest Conservation Need. Bald eagles and osprey, also PRRC and SGCN, take advantage of the open water on Lake Fairlee and the Connecticut River, and nest in supracanopy trees within the CFA. The unfragmented forests provide breeding habitat for species of conservation concern and forest interior dwelling species, including PRRC such as wood thrush, blackburnian warbler, Canada warbler, chestnut-sided warbler, and American woodcock.

2. Waterfowl

There is potential breeding and foraging habitat for American black duck, a PRRC species, wood duck, Canada geese, and other waterfowl species within wetlands associated with slow moving streams and open water habitats.

3. Diadromous fish and other aquatic species

The Ompompanoosuc River, and a few brooks and small ponds occur in the Ompompanoosuc CFA. The Ompompanoosuc River occurs in the western portion of the CFA where it flows southeast through Eagle Hollow and West Fairlee to the Connecticut River main stem. A few small streams in the CFA flow into the Ompompanoosuc River, while Blood Brook and Middle Brook flow into Lake Fairlee, located outside of the CFA's southern boundary. These water resources provide high quality cold water habitat for PRRC species, including brook trout and Atlantic salmon. These species are a high priority for conservation in the State and within the Service's Northeast Region. Other species that may occur in the Ompompanoosuc River CFA include creek chub, white sucker, slimy sculpin, and blacknose dace.

The Ely Copper Mine is less than a mile from the Ompompanoosuc CFA in Vershire, and is listed by the U.S. Environmental Protection Agency as a superfund site. Elevated metal and sulfide concentrations have affected nearby and downstream water resources, and the EPA has implemented a cleanup plan for portions of this site (U.S. Environmental Protection Agency 2013). Contamination of CFA habitats has not occurred, though the lower reaches of the Ompompanoosuc River has shown negative consequences. Providing healthy ecosystems within the CFA will assist with mitigating impacts from this superfund site.

4. Wetlands

The Ompompanoosuc River CFA contains 109 acres of conifer swamp, 126 acres shrub-swamp, and floodplain forest, and 88 acres of freshwater marsh. Many of these wetlands are associated with slow moving streams or small ponds. Patch size ranges from 2 acres to over 80 acres.

5. Other

The Ompompanoosuc River CFA southwestern boundary is less than a mile from the abandoned Ely Copper Mine. Over eight hundred bats have hibernated in this mine before the presence of white-nose syndrome, including little brown bats, northern long-eared bats, tricolored bats, eastern small-footed and big brown bats. A survey by Vermont Fish and Wildlife in 2013 showed a drastic decline in bats, with just under 200 present (Darling personal communication). Little brown and northern long-eared bats were hit the hardest from white-nose syndrome. Northern long-eared bats were recently listed as federally threatened. Little brown bats, as well as the tricolored and eastern small-footed bats, are undergoing review for listing under the ESA, and therefore are a PRRC. Little brown bat and tricolored bat are currently being assessed for candidate status, and eastern small-footed bat have been petitioned for listing under the ESA. Although this hibernaculum is less than a mile from the CFA boundary, the habitats within the CFA are still significant for roosting, feeding and for potential maternity sites

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

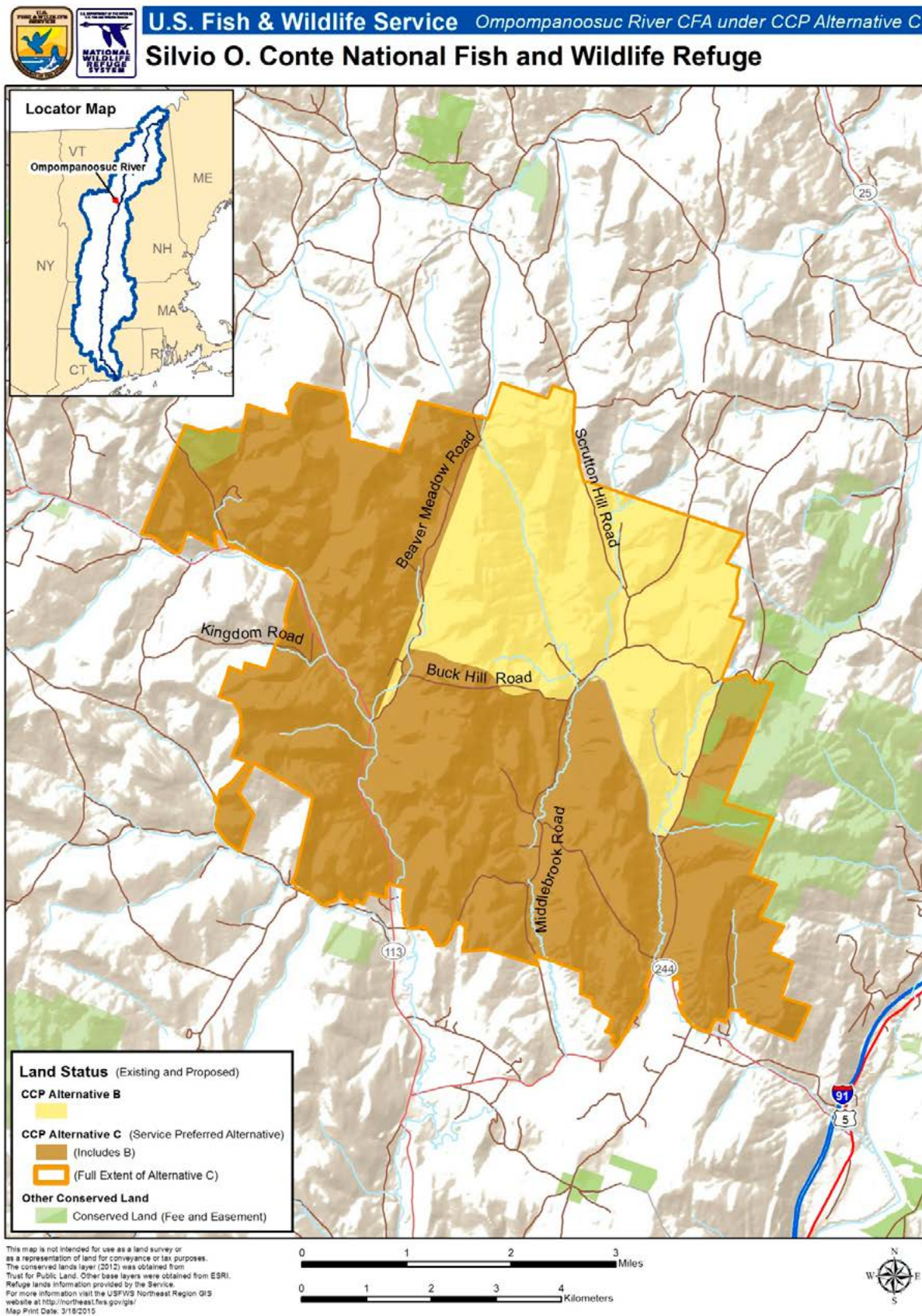
We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (e.g., forested, non-forested and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down Habitat Management Plan (HMP). Once inventory has been completed, then management will focus on maintaining the following conditions:

- Forest management activities will provide diversity of seral stages including early successional and mature forested habitats. The forests in the CFA will be structurally diverse (different size classes) and native species will dominate.
- We will conduct management activities in wetland habitats, and pasture, hay, grassland habitats. Wetland management will focus on maintaining the natural hydrology and native species composition. Invasive plant management will be a priority.
- In open water (stream, rivers, ponds) habitats, we will focus on maintaining forested stream buffers, a structurally diverse instream habitat, and uninterrupted aquatic species passage to spawning and wintering habitat.

What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

The National Wildlife Refuge System Improvement Act of 1997 identified hunting, fishing, wildlife observation, photography, interpretation, and environmental education as priority, wildlife-dependent uses. As such, these uses would receive priority on refuge lands.

Map A.60. Ompompanoosuc CFA – Location.



Map A.61. Ompompanoosuc CFA – Habitat Types.

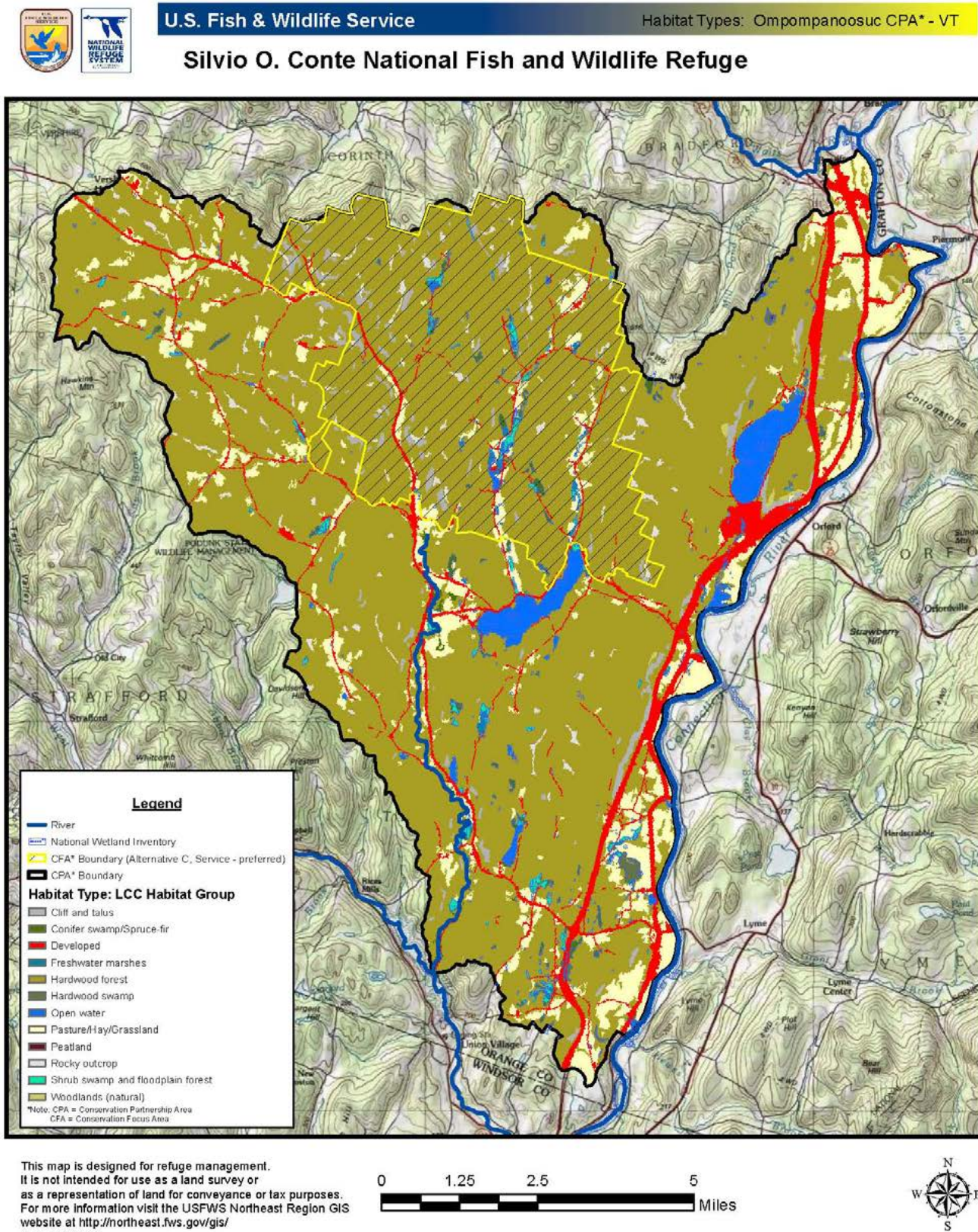


Table A.43. Ompompanoosuc CPA/CFA – Habitat Types.

| LCC General Habitat Type ¹ | CPA ² | | CFA ³ | | | |
|--|------------------|-----------------------------|------------------|----------------------------------|--------------------------|--------------------------|
| | Total Acres | Percent of CPA ⁴ | Total Acres | Conserved by Others ⁵ | USFWS Owned ⁶ | Percent CFA ⁷ |
| Forested Uplands and Wetlands⁹ | | | | | | |
| Conifer swamp/spruce-fir | 458 | 0.7% | 109 | 0 | 0 | 0.7% |
| Hardwood forest | 47,680 | 76.5% | 13,282 | 280 | 0 | 86.4% |
| Hardwood swamp | 152 | 0.2% | 0 | 0 | 0 | 0.0% |
| Shrub swamp and floodplain forest | 415 | 0.7% | 126 | 0 | 0 | 0.8% |
| Woodlands (natural) | 88 | 0.1% | 0 | 0 | 0 | 0.0% |
| <i>Forested uplands and wetlands subtotal</i> | <i>48,793</i> | <i>78.3%</i> | <i>13,517</i> | <i>280</i> | <i>0</i> | <i>87.9%</i> |
| Non-forested Uplands and Wetlands⁹ | | | | | | |
| Cliff and talus | 1,059 | 1.7% | 463 | 21 | 0 | 3.0% |
| Freshwater marshes | 220 | 0.4% | 88 | 0 | 0 | 0.6% |
| Pasture/hay/grassland | 5,939 | 9.5% | 619 | 3 | 0 | 4.0% |
| Peatland | 2 | 0.0% | 0 | 0 | 0 | 0.0% |
| Rocky outcrop | 719 | 1.2% | 259 | 4 | 0 | 1.7% |
| <i>Non-forested uplands and wetlands subtotal</i> | <i>7,938</i> | <i>12.7%</i> | <i>1,429</i> | <i>29</i> | <i>0</i> | <i>9.3%</i> |
| Inland aquatic habitats⁹ | | | | | | |
| Open Water | 1,299 | 2.1% | 30 | 0 | 0 | 0.2% |
| <i>Inland aquatic habitats subtotal</i> | <i>1,299</i> | <i>2.1%</i> | <i>30</i> | <i>0</i> | <i>0</i> | <i>0.2%</i> |
| Other | | | | | | |
| Developed | 4,288 | 6.9% | 395 | 2 | 0 | 2.6% |
| <i>Other subtotal</i> | <i>4,288</i> | <i>6.9%</i> | <i>395</i> | <i>2</i> | <i>0</i> | <i>2.6%</i> |
| TOTAL | 62,318 | 100.0% | 15,370 | 310 | 0 | 100.0% |

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Partnership Area

3 - Conservation Focus Area; representing Service - preferred Alternative C

4 - Percentage of the CPA represented by the habitat type

5- Acres in the CFA currently conserved by others (TNC 2012)

6 - Acres in the CFA currently owned by the USFWS

7 - Percentage of the CFA represented by the habitat type

8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C

9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.44. Ompompanoosuc CFA – Preliminary Priority Resources of Concern.

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|--|---|--|
| Forested Uplands and Wetlands⁴ | | |
| Hardwood Forest⁵ - 13,282 acres | | |
| Wood Thrush^{A, B, C} | Breeding habitat includes contiguous mature forests (80+ years old) dominated by deciduous tree species, moist soils, a moderate to dense sub-canopy and shrub density, open forest floor and closed canopy (Roth et al. 1996, Rosenberg et al. 2003). | Ruffed Grouse^{A, I} Whip-poor-will ^{A, I, J} Chestnut-sided Warbler^{A, I} Brown Thrasher ^I Ovenbird^A Eastern Red Bat^I |
| American Woodcock ^{A, B, C} | Breeding and roosting habitat includes young deciduous and mixed forests (1-20 years old) dominated by aspen and birch, and 3+ acre forest openings with 60% shrub cover, in proximity to alder wetlands and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994). | American Redstart ^{A, J} Black-and-white Warbler ^J Broad-winged hawk ^J Eastern Wood-pewee ^{A, J} Northern Flicker ^{A, J} Red-shouldered Hawk ^{I, J} Black-throated Blue Warbler ^A Yellow-bellied Sapsucker ^{A, J} |
| Chestnut-sided Warbler^{A, B, I} | Early successional deciduous forested upland and wetland habitat (Dunn et al. 1997, Richardson et al. 1995) | Veery ^A Rose-breasted Grosbeak ^A Black Bear ^I Bobcat ^I |
| Little Brown Bat ^E Tri-colored Bat ^E Northern Long-eared Bat ^E Eastern Small-footed Bat ^E | Caves used for hibernation. Roosting trees located in forested landscapes clustered in stands of large trees with cavities or loose bark. Cliffs, ledges, talus slopes also important for roosting/nesting. Maternity trees (8"-14" dbh) and travel corridors to water are also important (Degraaf et al. 2001, and Darling Guidelines, unpublished). | Jefferson Salamander ^I Four-toed Salamander ^I Black-throated Green Warbler ^A Canada Warbler ^{A, I} Purple Finch ^A Black-billed Cuckoo ^{A, I} Northern Parula ^{aA} |
| Blackburnian Warbler^A | Breeding habitat includes mature conifer, and conifer-deciduous forests (80+ years old) (Degraaf et al. 2001, Hodgman et al. 2000, Dunn et al. 1997, Morse 2004). | |
| Bald Eagle ^{C, G} Osprey ^G | Breeding and migrating habitat includes large bodies of water with little human disturbance, and large canopy trees or other elevated sites for nesting, perching, and roosting (DeGraaf et al. 2001). | |
| Forested Uplands and Wetlands⁴ | | |
| Shrub Swamp and Floodplain Forest⁵ - 126 acres | | |
| Little Brown Bat ^E Tri-colored Bat ^E Northern Long-eared Bat ^E Eastern Small-footed Bat ^E | Caves used for hibernation. Roosting trees located in forested landscapes clustered in stands of large trees with cavities or loose bark. Cliffs, ledges, talus slopes also important for roosting/nesting. Maternity trees (8"-14" dbh) and travel corridors to water are also important (Degraaf et al. 2001, and Darling Guidelines, unpublished). | Chestnut-sided Warbler ^{A, I} Black Racer ^I Ruffed Grouse ^{A, I} American Woodcock ^{A, I} Warbling Vireo Willow Flycatcher American Redstart ^{A, J} |
| American Black Duck ^{A, B, C, G} | Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001). | Eastern Kingbird ^J Gray Catbird ^J Wood Duck ^{A, J} Canada Goose ^J Mallard ^J Veery ^{A, I} |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|--|---|---|
| Forested Uplands and Wetlands⁴ | | |
| Swamps (Conifer)⁵ – 109 acres | | |
| Canada Warbler ^{A, B, C} | Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 feet within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997). | Northern Waterthrush Red-shouldered Hawk ^{I, J} Rose-breasted Grosbeak ^{A, J} Purple Finch ^A Veery ^{A, I, J} White-eyed Vireo ^J Willow Flycatcher ^J Wood Duck ^{A, J} Northern Parula ^A |
| Non-Forested Uplands and Wetlands⁴ | | |
| Cliff and Talus⁵ – 463 acres | | |
| Peregrine Falcon ^{C, G} | Nests on cliffs, ledges, and talus slopes near open habitats including rivers, lakes, and marshes, and lack of human disturbance (DeGraaf et al. 2001). | Uncommon plant community within the landscape that contributes to BIDEH* |
| Freshwater Marshes⁵ - 88 acres | | |
| American Black Duck ^{A, B, C, G} | Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001). | Canada Goose ^J Mallard ^J Marsh Wren Northern Harrier ^{A, I, J} Great Blue Heron ^I American Bittern ^{A, I} Eastern Ribbon Snake ^I Water Shrew ^I Wood Duck ^J |
| Non-Forested Uplands and Wetlands⁴ | | |
| Pasture/Hay/Grassland⁵ - 619 acres | | |
| American Woodcock ^{A, B, C} | Roosting habitat includes old fields with scattered tall herbaceous vegetation and/or shrubs. Herbaceous openings such as log landings and pasture used for singing grounds (Kelley et al. 2008, Sepik et al. 1994). | Field Sparrow ^J Northern Harrier ^{A, I, J} Chestnut-sided Warbler ^{A, I} Bobolink ^{A, I} Grasshopper Sparrow ^I Eastern Meadowlark ^I |
| Rocky Outcrop⁵ – 259 acres | | |
| Laurentian-Acadian calcareous rocky outcrop ^H | This outcrop system occurs on ridges or summits of circumneutral (pH 5.5 to 7.4) to calcareous (pH >7.4) bedrock. Sites are often exposed and dry; however, there may be local areas of more moist conditions. The vegetation is often a mosaic of woodlands and open glades. This system may also occur on rocks that are primarily acidic but with a local influence of calcium through weathering (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|---|--|--|
| Inland Aquatic Habitats⁴ | | |
| Open Water⁵ – 30 acres | | |
| Brook Trout^{B, F} | Spawning habitat includes clear, well oxygenated cold water lakes/ponds/streams with silt-free rocky substrate, abundant cover, vegetated banks, stable temperatures and stream flow (VTWAP 2005). | Riffle Snaketail ¹ Brook Snaketail ¹ Maine Snaketail ¹ Zebra Clubtail ¹ Water Shrew ¹ |
| Atlantic Salmon^{B, E, G} | Spawn in cold freshwater moving streams w/ coarse clean gravel and adequate food/cover. Migrate in large rivers (VTWAP 2005). | |

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

A: 2008 Bird Conservation Region 14.

B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.

C: 2008 USFWS Birds of Conservation Concern.

D: Federal Threatened and Endangered status as of 2010, including Candidate Species

E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010

F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan

G: Silvio O Conte Refuge Purpose Species.

H: 2008 North East Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

A: 2008 Bird Conservation Region 14.

I: 2005 Vermont Wildlife Action Plan (Species of Greatest Conservation Need)

J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Goals, Objectives, and Strategies for Refuge Lands in the Ompompanoosuc CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forests)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure for the diversity of species present, including wood thrush, American woodcock, chestnut-sided warbler, blackburnian warbler, Canada warbler, bald eagle, osprey, and cave dwelling bats.

Rationale:

We envision healthy forests within the Ompompanoosuc CFA where a diverse seral structure provides suitable breeding and post-breeding habitat conditions for a suite of Vermont's wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010, Fraver et al. 2011).

Ompompanoosuc CFA hardwood forests are diverse and productive for wildlife, and abundant, high-quality habitat is most certainly available within the CFA. However, to date our review of Ompompanoosuc's habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, and an understanding of forest disturbance and land-use history in New England. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within Ompompanoosuc comes exclusively from a reading of forest history in New England—a legacy of intensive past-use that altered the vegetation structure and composition, landscape patterns, and ongoing ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, Bellemare et al. 2002, Hall et al. 2002). Our sub-objective assumes the forests of Ompompanoosuc are more homogeneous than those of three centuries earlier, and include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Goodburn and Lorimer 1998, Foster et al. 1998, Foster 2000, Bellemare et al. 2002, Cogbill et al. 2002, Abrams 2003). Completing a comprehensive forest and habitat inventory post-acquisition will test these assumptions, and aid in identifying stands where a forest management approach that combines passive management with the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and move succession forward to emulate later seral stage characteristics.

For forest birds, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. While our management goals may create a relatively old forest, hardwood forests within Ompompanoosuc will contain a variety of patches in different age classes and developmental stages; it is not uniform throughout. This diversity of age classes provides a variety of bird species with a range of nesting and foraging opportunities. Further, finer-scale investigation of forest conditions may identify opportunities to improve age class diversity through the creation of early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like American woodcock, are declining as remaining patches of young forest mature (Sepik et al. 1994, Kelley et al. 2008). Across the CFA, enhanced horizontal structure should support other species of conservation concern like chestnut-sided warbler, ruffed grouse, bald eagles, and—if wetlands and riparian areas are present—Canada warbler (Lambert et al. 2005, Reitsma et al. 2008, Chace et al. 2009).

In a mature forest, many nesting bird species tend to remain within specific vegetation layers: on or near the ground, in the middle layer, or up in the canopy. Ompompanoosuc's hardwood forests should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of nesting and foraging opportunities. Patches of very dense native shrub and understory layers (0-5 feet in height) are of particular importance to species like Canada warbler. These habitat elements may have importance to declining mature forest-interior species identified in regional conservation plans like wood thrush and blackburnian warbler. Wood thrush nest and feed at the ground level; a sub-canopy layer of shrubs, moist soils and leaf litter are important habitat features (Roth et al. 1996, Rosenberg et al. 2003). Wood thrush also has significance as a NALCC representative species for hardwood forests in the NALCC southern sub-region. Improving vertical diversity by preserving softwood inclusions during forest management may provide an important habitat component for blackburnian warblers, who dwell in the upper canopies of conifers, and are thought to be strongly associated with the hemlock forests within Ompompanoosuc. Blackburnian warblers have been shown to decline in response to removal of hemlock by hemlock wooly adelgid (Tingley et al. 2002).

Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater than 75 to 80 percent closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like wood thrush. The distribution and concentration of these openings will vary, but interior forest conditions will be maintained on the whole. Closed canopy conditions favor a suite of interior-nesting bird species that include: ovenbird, black-throated green warbler, and black-throated blue warbler.

Efforts to maintain or improve seral stage diversity within the CFA will include the retention of large-diameter (24 inches or greater dbh) trees where appropriate. Such larger trees are either absent or are very few in younger forests, and that has implications for the habitat of wildlife species and for nutrient cycling. The Ompompanoosuc River CFA southwestern boundary is less than a mile from the abandoned Ely Copper Mine (see sub-objective 1.2b for further discussion). Over eight hundred bats have hibernated in this mine before white-nose syndrome, including little brown bats, northern long-eared bats, tricolored bats, eastern small-footed and big brown bats. A survey by Vermont Fish and Wildlife in 2013 showed a drastic decline in bats, with just under 200 present (Darling personal communication 2013). Little brown and northern long-eared bats were hit the hardest from white-nose syndrome. These species, as well as the tricolored and eastern small-footed bats, are undergoing review for listing under the ESA, and therefore are a PRRC. Little brown bat and tricolored bat are currently being assessed for candidate status, while northern long-eared and eastern small-footed bat have been petitioned for listing under the ESA. Upon emergence from the hibernacula, females will travel to their summer range to give birth to pups in maternity colonies, while male bats often remain within 5 miles of the hibernaculum throughout the summer (Darling, unpublished). Crevices behind peeling bark of large diameter trees or cavities in partially decayed trees are used for maternity colonies and summer day roosts (Caceres and Pybus 1997). CFA habitats may still play a significant role as roosting, feeding, and potential maternity sites.

Structurally-sound, large-diameter trees are important nest sites for woodland raptors, such as the red-shouldered hawk. Emergent white pines—tall, large-diameter trees that extend above the canopy—provide special habitats that, when near open bodies of water, are utilized by bald eagles and osprey. Standing trees that are dead and/or contain cavities will be present in all size classes for those species, like black bear, that require large logs or trees for their dens (Wynne and Sherburne 1984, Chapin et al. 1997, DeGraaf and Yamasaki 2001). Snags and cavity trees also provide important nesting and foraging sites for bird species such as nuthatches, owls, and woodpeckers, like the yellow-bellied sapsucker.

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure, species composition, and/or ecological function. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Identify forest stands where soils and species composition will support woodcock management.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Within 10 years of land acquisition and CCP approval:

- Retain and recruit 3 to 6 large (16 inch DBH) live or dead trees such as silver maple, beech, green ash, yellow birch, and sugar maple per acre within a 5-mile radius of bat hibernacula as bat roosting sites.
- Create small canopy openings to improve solar exposure of existing or potential roost trees.
- Maintain contiguous late successional forest cover within 2 to 3 miles of rock cliffs and ledges to protect potential roosting sites of eastern small-footed bats.
- Implement identified active forest management opportunities using accepted silvicultural practices.
- Protect hard and soft mast producing species such as American beech inclusions, and apple and cherry trees, through the use of best management practices.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1b. (Shrub Swamps and Floodplain Forest)

Manage shrub swamp and floodplain forest communities to support natural and rare ecological communities, and provide potential breeding and foraging habitat for priority refuge resources of concern including bat species and American black duck.

Rationale:

Shrub swamps are restricted to poorly drained areas, small seepage zones, and wide alluvial stretches of rivers and small streams. Shrubs tend to dominate the wetland, though grasses may be present. Typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush (Gawler 2008). These wetlands are also created through beaver activity, a natural and important disturbance process within the CFA. The landscape mosaic of flooded areas and ponds in various stages of succession provide a diversity of plant communities, and habitats for a variety of wildlife species, including foraging bats and American black duck, priority refuge resources of concern.

A forested landscape comprised of large diameter trees, and openings provide the most suitable habitat for bats (see sub-objective 1.1a). Foraging activity generally occurs in forest cover, though the specific habitat often depends on the species flight ability and echolocation frequency. Stream corridors, wetlands, vernal pools, and ponds provide high insect populations for feeding bats, as well as a water source (Caceres and Pybus 1997,

Zimmerman and Glanz 2000, Brooks and Ford 2005). Access to water is an important resource to prevent dehydration. Management in the CFA will focus on maintaining forested buffers along water bodies and shrub wetlands, and connectivity to forest habitats.

American black ducks also use shrub swamp communities, with a preference for shrub swamps that are flooded or adjacent to open water habitats. Black ducks rely on these wetlands during the breeding season and as stopover habitat during migration. Adults and their broods forage on seeds, aquatic vegetation, and invertebrates in flooded shrub swamp communities, or adjacent open water habitats. Adults place well-concealed nests near foraging habitat in nearby uplands or dry hummocks in the wetland (Longcore et al. 2000, DeGraaf and Yamasaki 2001). American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 14. Protecting and managing these shrub wetland communities from potential threats, including invasive species introduction, altered hydrology, and fragmentation, will contribute to the conservation of this species.

Bat species and American black duck are not the only species that rely on shrub swamp habitats. American woodcock, a priority refuge resource of concern will benefit from shrub swamp management. American woodcock require moist, rich soils dominated by dense shrub cover for foraging habitat. Shrub swamps dominated by alder is ideal, although young aspen and birch are also suitable as feeding areas and daytime cover. Woodcock require varying habitat conditions that are within close proximity of each other. These include clearings for courtship, forest openings with sparse shrub or herbaceous cover for roosting, young deciduous forests of shade intolerant tree species for nesting and brood rearing, and functional foraging areas (Sepik et al. 1994, Kelley et al. 2008). Chestnut-sided warbler will also use shrub swamps. This species is declining across the region due to habitat loss, and is a HIGH species for conservation in BCR 14. Other species include willow flycatcher, ruffed grouse, and eastern ribbon snake.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of shrub swamps at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1c. (Conifer Swamps)

Improve the diversity of seral stages, (where and when possible) restore historic composition and structure, and improve the natural hydrology to support natural and rare ecological communities. Management will provide breeding and foraging habitat for refuge resources of concern including Canada warbler.

Rationale:

Of the forest types within the Ompompanoosuc Conservation Focus Area (CFA), conifer swamps frequently have been altered and have potential for restoration. This habitat type is often found in small patches on mineral soils that are nutrient poor; there may be an organic layer, but generally deep peat soils are absent. These basin wetlands remain saturated for all or nearly all of the growing season, and may have standing water seasonally. There may be some seepage influence, especially near the periphery. The dynamic nature of the watertable drives complexes of forest upland and wetland species including red maple, balsam fir, red spruce, and ash species. Where soils tend more to alkaline conditions, white cedar is a common tree species, and the shrub layer is generally more diverse. Within the Connecticut

River watershed, agricultural practices and selective logging have largely removed this habitat from the landscape, or greatly simplified its historic species composition. Changes in hydrology, water pollution, invasive species introductions, and soil compaction remain as threats.

Successional trends in softwood swamps are not well understood. Heavy cutting and clearing for agriculture often eliminated softwood species. Our conservation efforts within Ompompanoosuc will focus on promoting the ecological integrity of these stands through restoration of degraded floodplains, and (where and when possible) restoring composition and structure to accepted historical conditions. Restoration of the primary natural disturbance mechanism (seasonal flooding) will aid in the restoration of historical species mixtures.

Where needed, restoration of softwood swamp habitats will create high-quality habitat for neotropical migratory birds. Closed canopy softwood forests that include white cedar and other softwoods provide important mast, food, nesting, and cover. Softwood swamp stands with large average stand diameters, a variety of tree conditions (including large-diameter dead stems, live trees with hollow stems and dead limbs, and small diameter suppressed and dying stems), and nearby water have a high habitat potential for cavity-dwelling wildlife species (DeGraaf et al. 2006).

Canada warbler, a priority refuge resource of concern, occupies this habitat type with high densities occurring in mixed forested swamps (Lambert et al. 2005, Reitsma et al. 2008, Chace et al. 2009). The wet soil conditions in swamps limit the canopy closure, and frequent blow downs create canopy gaps. This provides a well developed shrub layer—an important habitat component for foraging and nest cover (Chace et al. 2009). Canada warbler shows area sensitivity in forests fragmented by suburban sprawl (Robbins et al. 1989). Conifer swamps in the Ompompanoosuc CFA are within a matrix of contiguous forest, where fragmentation is not a concern. Conifer swamp patches of ten acres or greater are thought to provide suitable breeding habitat for Canada warbler in the Ompompanoosuc CFA, and allow monitoring of population response to management actions (R. Dettmers personal communication 2013).

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood swamps at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Evaluate hydrologic regime to inform restoration efforts.
- Identify forest stands where management is necessary to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Work with partners, including the VFWD, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management.

Within 10 years of land acquisition and CCP approval:

- Implement identified forest management opportunities to improve species composition.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

- Map vernal pools and seeps.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Cliff and Talus)

Protect cliffs, ledges, and talus slopes to maintain the biological integrity, health and diversity of associated natural and rare ecological communities. Emphasis will be on sites occupied by nesting peregrine falcons and roosting bats.

Rationale:

Cliff and talus systems within this CFA occur below treeline at low to mid elevations. The vegetation is patchy and often sparse, punctuated with patches of small trees that may form woodlands in places (Gawler 2008). The type of rock, microclimate, and soil availability from higher elevation sources directly and indirectly influence vegetation within these systems (Thompson and Sorenson 2000). Rock types may include limestone, dolomite, granite, schist, slate, or shale which breakdown differently in the environment providing varying levels of nutrients, moisture, ground stabilization, and soil availability. Sun exposure, aspect, elevation, and moisture provide different microclimate conditions affecting vegetation type and growth. These systems provide unique niches for rare and uncommon plants, and habitat for snakes, including the rare eastern timber rattlesnake, black rat snake, and eastern garter snake. Exposed cliffs provide nesting habitat for turkey vultures, ravens, porcupines, and peregrine falcons, a state species of greatest conservation need. Peregrine falcons are also a refuge purpose species. Vermont's breeding population has increased steadily since they were extirpated from the eastern US in the mid to late 1960s due to indiscriminate use of DDT following World War II. Peregrines are nesting in Ompompanoosuc River CFA, and monitoring and management of Vermont's peregrine population is being coordinated by Audubon Vermont.

Bats will use caves or mines within the cliff and talus systems for "hibernacula," where they hibernate, and rock crevices for summer roosting sites. This region hosts bat hibernacula—the unused Ely Copper mine in Vershire. The Ely Copper mine has been surveyed each winter since 1992 by VFWD. More than 800 bats have hibernated in this mine before white-nose syndrome, including little brown, northern long-eared, tricolored, eastern small-footed, and big brown bats. A survey by VFWD in 2013 showed a drastic decline in bats, with just under 200 present (Darling personal communication 2013). Little brown and northern long-eared bats were hit the hardest from white-nose syndrome. Although this hibernaculum is less than a mile from the CFA boundary, the habitats within the CFA are still significant for roosting, feeding and for potential maternity sites (see sub-objective 1.1a for further discussion).

Conservation of cliff and talus systems in the Ompompanoosuc River CFA will begin with a comprehensive, multi-scale wildlife and habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent forest conditions and land uses within the CFA and associated landscape. Baseline information on the condition of cliff and talus systems at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Evaluate and manage human (e.g., recreational) influences on cliff and talus ecosystem, and conduct outreach and education as necessary.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

- Identify historical, active, and potential peregrine falcon nesting sites.
- Coordinate with conservation organizations to conduct spring surveys of identified sites to determine occupancy.
- Work with partners to annually monitor active sites to determine occupancy status and reproductive outcome.
- Survey for and protect bat roosting sites.

Sub-objective 1.2b. (Freshwater Marsh)

Manage freshwater marshes to support natural and rare ecological communities, and provide potential breeding and foraging habitat for priority refuge resources of concern including American black duck.

Rationale:

Freshwater marshes are often dominated by emergent and submergent herbaceous vegetation. Scattered shrubs are often present, and trees are generally absent. Herbaceous vegetation typically includes common bulrush, jewelweed, marsh fern, water lily and narrow-leaved cattail. This habitat is associated with lakes, ponds, impoundments, and slow-moving rivers and streams (Gawler 2008). These marshes are also maintained over time by beaver activity, an important natural disturbance process within the Ompompanoosuc River watershed. Our coarse-scale habitat analysis of this CFA identifies the majority of the wetlands occurring along the North and Middle Brooks. This particular wetland complex, adjacent to open water habitat, would provide important breeding and foraging habitat for American black duck, and other waterfowl species. Located within the Connecticut River watershed, an important migration corridor, this area may also be important as staging areas for migrating waterfowl. An evaluation of the wetlands in the CFA will be necessary to determine their potential as habitat for waterfowl species.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of freshwater marshes at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Minimize impacts to wetlands from adjacent habitat management and recreational activities.
- Encourage local landowners to use Vermont Best Management Practices within active agricultural fields that are located along the perimeter of marsh habitats.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Inventory wetland plant communities, and evaluate wetland hydrology for potential impacts to the natural flow regimes.
- Survey wildlife use of existing wetlands.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.2c. (Pasture/Hay/Grassland)

Manage pasture, hay, and grasslands (where appropriate) as part of a mosaic of habitat conditions required by American woodcock and other shrub-dependent conservation concern species such as chestnut-sided warbler. Also maintain large contiguous tracts of grassland habitat, if present and appropriate.

Rationale:

More than four percent of the Ompompanoosuc River CFA is pasture, hay, and grassland habitat. These habitat types require active manipulation to inhibit the natural succession of converting to forest. The pasture, hay,

and grassland habitats tend to be dominated by grasses. Depending on habitat patch size, continuity of patches and timing of manipulations, this habitat type will support grassland dependent species such as bobolink and grasshopper sparrow. If these habitats are left unmaintained (e.g. not mowed), they will convert to a mixture of shrubs and grasses, providing “old field” habitat for shrub dependent species such as chestnut-sided warbler, prairie warbler and field sparrow. American woodcock, a refuge priority resource of concern, will use both habitat conditions when managed in conjunction with their other habitat needs.

Many shrubland bird breeding populations occur in high proportions in the northeast, and therefore, are species of conservation responsibility (Dettmers, Randy 2003). For example, over 12% of the chestnut-sided warbler population breeds in BCR 14 (Dettmers, Randy 2006). While there is evidence that southern New England supported a small but significant grassland bird community before European settlement, only a small proportion of grassland breeding bird populations occurs in the northeast (Dettmers and Rosenberg 2000). Maintaining high quality shrubland habitat in this CFA will provide habitat for a higher percentage of species in decline. However, large and contiguous grasslands are rare in the watershed, and large grassland habitat patches are important to high priority grassland species and overall biological diversity. We will maintain large grassland patches (e.g. 500 acres), or areas where a high proportion of grassland cover is present in the landscape (e.g., a mosaic of many medium to large patches).

Shrubland and grassland habitats will also be used by American woodcock, which require diverse structural habitat conditions within close proximity of each other: clearings for courtship, forest openings with sparse shrub or herbaceous cover for roosting, young hardwood forests of shade intolerant tree species for nesting and brood rearing, and functional foraging areas (Sepik et al. 1994, Kelley et al. 2008). Small clearings with minimal vegetation is required for courtship areas, and shrublands with clumps of tall vegetation or sparse shrubs will provide roosting habitat.

Shrubland dominated habitats in the northeast support many species of conservation concern, many of which are a high conservation responsibility for the region, indicating the importance of shrubland habitats to these species in the CFA. Large, contiguous grassland habitats are also important to a suite of priority grassland bird species. Current pasture, hay, and grassland acres can provide quality habitat, for these species, and American woodcock, if managed appropriately. Baseline information on the condition of these habitats and association with other landscape features will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to protect and promote farming practices (e.g. haying and pasture of animals) that benefit wildlife and protect water quality.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct an inventory of these habitats to determine their condition, size and location, which will inform and prioritize appropriate management strategies in the HMP.

Sub-objective 1.2d. (Biological Integrity, Biological Diversity, and Environmental Health)

Where and when appropriate, protect, or restore habitats absent an identified species of conservation concern, recognizing the importance of all habitats in contributing to the biological integrity, diversity, and environmental health of refuge lands and the Watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges’ “biological integrity, diversity, and environmental health” (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem’s current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such

as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Ompompanoosuc CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.

- Map natural communities; protect rare or exemplary examples.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, manage water resources and riparian areas to provide cold temperature regimes, substrate diversity, and unimpeded aquatic species passage that benefit priority refuge resources of concern including Eastern brook trout and Atlantic salmon.

Rationale:

The Ompompanoosuc River, and a few brooks and small ponds occur in the Ompompanoosuc CFA. The Ompompanoosuc River occurs in the western portion of the CFA where it flows southeast through Eagle Hollow and West Fairlee to the Connecticut River main stem. A few small streams in the CFA flow into the Ompompanoosuc River, while Blood Brook and Middle Brook flow into Lake Fairlee, located outside of the CFA's southern boundary. These water resources provide high quality cold water habitat for brook trout and Atlantic salmon. These species are sensitive to extreme temperature fluctuations, and require water temperatures between 40-70 degrees Fahrenheit for spawning, growth, and survival. Brook trout and salmon are a high priority for conservation by the State and the Service's Northeast Region. Other species that occur in the Ompompanoosuc River CFA include creek chub, white sucker, slimy sculpin, and blacknose dace.

The Ely Copper Mine is less than a mile from the Ompompanoosuc CFA in Vershire, and is listed by the U.S. Environmental Protection Agency as a superfund site. Elevated metal and sulfide concentrations have affected nearby and downstream water resources, and the EPA has implemented a cleanup plan for portions of this site (U.S. Environmental Protection Agency 2013). Contamination of CFA habitats has not occurred, though the lower reaches of the Ompompanoosuc River have shown negative consequences. Providing healthy ecosystems within the CFA will assist with mitigating impacts from this superfund site.

Management of water resources in the Ompompanoosuc River CFA will focus on rivers and streams that provide continuous aquatic species passage to spawning and wintering habitat, are structurally diverse, with boulders and downed woody debris providing riffles and pools, and shade trees along riparian edges. Due to our lack of knowledge regarding habitat conditions in the CFA, implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife and habitat inventory. Aquatic species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent forest conditions and land uses within the CFA and associated landscape. Baseline information on the condition of open water habitat at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 10 years of land acquisition and CCP approval:

- Work with partners to implement a remediation plan for identified obstacles to aquatic species passage.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to conduct stream assessments to evaluate the physical, chemical, and biological condition of the fish community structure, productivity and health.
- Work with partners to conduct stream assessments to identify man-made physical barriers (e.g., impassable road crossings, culverts and dams) to the movement of fish and other aquatic organisms.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not Applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not Applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the Ompompanoosuc Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Management Strategies:

Within 1 year of acquiring sufficient land:

- Design or adapt curricula for the Ompompanoosuc Division that focuses on watersheds, on local habitats, and on local natural and cultural resources.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Ompompanoosuc Division as an outdoor classroom.

Rationale:

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Ompompanoosuc Division as an outdoor classroom.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the Ompompanoosuc Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA compliant trail planned for the site, the Ompompanoosuc Division would be suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the Ompompanoosuc Division's habitats and cultural resources.

Management Strategies:

Within 5 years of acquiring sufficient land:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the Ompompanoosuc Division.
- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of acquiring sufficient land:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, print and social media, signs, and exhibits) when creating programming for natural and cultural resource interpretation.
- Make Certified Interpretive Guide (NAI) training available once every other year for refuge personnel, Friends Group members and the general public, with priority given to refuge affiliates.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the Ompompanoosuc Division.
- Incorporate thematic statements, measureable objectives, and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures, i.e., general brochure and bird checklist that incorporate refuge interpretive messages and themes.

- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Ompompanoosuc Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the Sunderland and Nulhegan Basin Division Offices and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Ompompanoosuc Division would be unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and which provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access, and Infrastructure)

Provide the opportunity for a quality hunting experience following state regulations, except as noted under Strategies below.

Rationale:

The Ompompanoosuc CFA is a popular area to hunt white-tailed deer, Eastern wild turkey, black bear, and small game. Hunting would be allowed on a newly created division consistent with the final compatibility determination. Hunting, if found to be a compatible use, will be allowed when the Service acquires land that can support hunt seasons. Retaining hunting opportunities on public lands will ensure this wildlife-dependent recreational activity continues and contribute to the state's population management objectives.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Complete all administrative requirements to officially open to hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Allow hunters access to the refuge outside of the normal division open hours (i.e., 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with VFWD to determine whether opportunities exist for state-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with VFWD to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge website, at Ompompanoosuc Division kiosks, through a friends group, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with VFWD to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.
- Offer to host hunter education field courses.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access and Infrastructure)

Provide quality fishing opportunities at the Ompompanoosuc Division after completing all administrative procedures to officially open refuge lands to fishing, based on VFWD regulations, and any division-specific conditions.

Rationale:

There are several streams in the proposed CFA including the Ompompanoosuc River, Middle Brook, Blood Brook, and Bear Notch Brook. The Ompompanoosuc River supports a cold water fishery with brook trout, brown trout, and rainbow trout. A variety of game fish are found in the other streams of the CFA, with quality fishing opportunities for brook trout in Middle Brook and Bear Notch Brook. Fishing is a popular activity throughout this area and would continue under Service ownership. Retaining fishing opportunities conforms to historic use on CFA and much of the surrounding land in the area.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Complete all administrative requirements to officially open to fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk to post information on fishing seasons and other notices to visitors.
- The Ompompanoosuc Division would be open daily to all visitors, including anglers, from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters.

Within 5 years of acquiring land with fishable waters:

- Work with the VFWD to inventory and assess fish populations on the division.
- Work with the VFWD to evaluate potential fishing enhancements, especially to Middle Brook and Bear Notch Brook.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine whether the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Fishing is a priority public use and a traditional use in the CFA. If land is acquired, the refuge will make information readily available to interested anglers regarding opportunities to fish on Service-owned land, location of fishable waters, and the available game fish.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available at the refuge website, refuge offices, division kiosks, through friends groups, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography for people of all physical abilities.

Rationale:

Wildlife viewing and photography are priority public uses on national wildlife refuges and a popular recreational activity. Local organizations such as Vermont Audubon chapters and others offer organized field trips to popular natural areas. A new division in this area would offer people the chance to see and photograph wildlife and in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land:

- Allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters and anglers.
- Install an informational kiosk in a conspicuous location to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 5 years of acquiring sufficient land:

- Develop a public access strategy and required planning (e.g., NEPA compliance and compatibility determinations) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring sufficient land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with a friends group and other partners that host events designed to view wildlife on the division.

Rationale:

The entire division would be available for wildlife observation and photography; however, there are steps the refuge can take to enhance the experience. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of acquiring sufficient land:

- Develop interpretive panels for kiosks and trails that describe typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.
- Encourage local schools and groups such as a local chapter of Vermont Audubon and other environmental organizations to offer wildlife-centered trips to the refuge.
- Produce a list of wildlife species and associated habitats and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.

Within 10 years of acquiring sufficient land:

- Develop a public access strategy and required NEPA documentation that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Ompompanoosuc Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional water-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as fishing, boating, and wildlife observation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any water trails (e.g., canoe/kayak trails) that part of a regional or State network for their compatibility.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Ompompanoosuc Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking, wildlife observation, and interpretation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that are part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Develop compatible opportunities on the Ompompanoosuc Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land:

- Allow dispersed hiking, snowshoeing, and cross-country skiing.
- Allow pet walking; pets must be on a leash no longer than 6 feet long and must be under the control of their owners/handlers to avoid posing a threat to other visitors, staff, or wildlife.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Work with users to delineate winter cross-country trails and determine whether a special use permit to manage winter trails is warranted.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.

Within 5 years of acquiring sufficient land:

- Work with Friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge divisions and units.

Overview Ottauquechee River Conservation Focus Area (Proposed)

Bridgewater, Vermont

| Conservation Focus Area (CFA)—Acreage Profile | Acres | Percentage of CFA |
|---|-------|-------------------|
| Total CFA Acres to be Conserved by Service | 5,985 | 100 % |
| ■ <i>Existing Refuge Ownership in CFA</i> ¹ | 0 | |
| ■ <i>Additional Acres in CFA proposed for Refuge Acquisition</i> ² | 5,985 | |
| Existing Acres in CFA Permanently Conserved by Others ^{2,3} | 0 | 0 % |
| Total Acres in CFA ^{2,4} | 5,985 | 100 % |

¹Acres from Service's Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers. .

What specific criteria and/or considerations drove the selection of this CFA?

The proposed Ottauquechee River CFA is located near a large network of conserved lands, including Les Newell Wildlife Management Area and extensive lands protected by the Vermont Land Trust lands. Additional land protection by the Service in this area will help better connect these conserved lands. The Appalachian Trail Corridor also abuts the proposed CFA, providing outstanding recreational opportunities. The proposed CFA encompasses contiguous forest, which is expected to be resilient to climate change impacts.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Hardwood Forest – 87.5%

See map A.63 and table A.45 for more detailed habitat information for the CFA.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.46 below, there are nine Priority Refuge Resources of Concern (PRRC) terrestrial and aquatic species that may rely upon the diverse habitats in this CFA. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. The refuge will seek to protect and restore (if necessary) these habitat types. Additionally, we recognize the value of this area to species that require large contiguous forest tracts including American black bear, bobcat, and forest interior dwelling bird species. These species and others are discussed further below.

1. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA), and habitats along the main stem, receive higher use by migrating landbirds. As birds move north, they disperse beyond the Connecticut River main stem, becoming more evenly distributed in habitats across the watershed (Smith College 2006). The Ottauquechee River CFA not only provides important stopover habitat for migrating landbirds, but breeding habitat as well.

Over 89% of the CFA is contiguous forest, interspersed with riparian, cliff and talus, and rocky outcrop communities. These habitats contribute to the larger core of undeveloped land within the landscape. The CFA provides breeding for a diversity of landbirds including species of conservation concern and forest interior dwelling species. This CFA is in the core range for many of these species including black-throated blue warbler, blackburnian warbler, chestnut-sided warbler, black-throated green warbler, and wood thrush. Wood thrush and chestnut-sided warbler are PRRC species that rely on different forest successional stages within the CFA. Peregrine falcon is another PRRC species, as well as a State Species of Greatest Conservation Need (SGCN). The cliff and talus systems in the CFA are used by nesting peregrine falcons, where the elevations can rise above 2,000 feet.

2. Diadromous fish and other aquatic species

The North Branch of the Ottawaquechee River flows along the west boundary of Ottawaquechee CFA. This branch flows southeastwardly through the towns of Killington and Bridgewater meeting up with the Ottawaquechee main stem in Bridgewater Corners. The North Branch provides high quality cold water habitat for PRRC species including brook trout and Atlantic salmon. These species are high conservation concern for the State and the Service's Northeast Region. Other species that occur in the Ottawaquechee River CFA include creek chub, white sucker, slimy sculpin, and blacknose dace.

3. Other

The Ottawaquechee River CFA western boundary is within a mile of the abandoned Bridgewater Mines, which were once occupied by more than 100 hibernating little brown, tri-colored, big brown and northern long-eared bats. These mines are no longer being used by bats due to decimation by white-nose syndrome. Northern long-eared bats were recently listed as federally threatened. Little brown bats, as well as the tricolored and eastern small-footed bats, are undergoing review for listing under the ESA, and therefore are a PRRC. Little brown bat and tricolored bat are currently being assessed for candidate status, and eastern small-footed bat have been petitioned for listing under the ESA. The habitats within the CFA may still provide current or future roosting, feeding and potential maternity sites.

The rocky outcrops and forested habitats within the CFA provide denning sites for American black bear and bobcat, as well as a contiguous landscape for these wide ranging mammals to breed and disperse.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

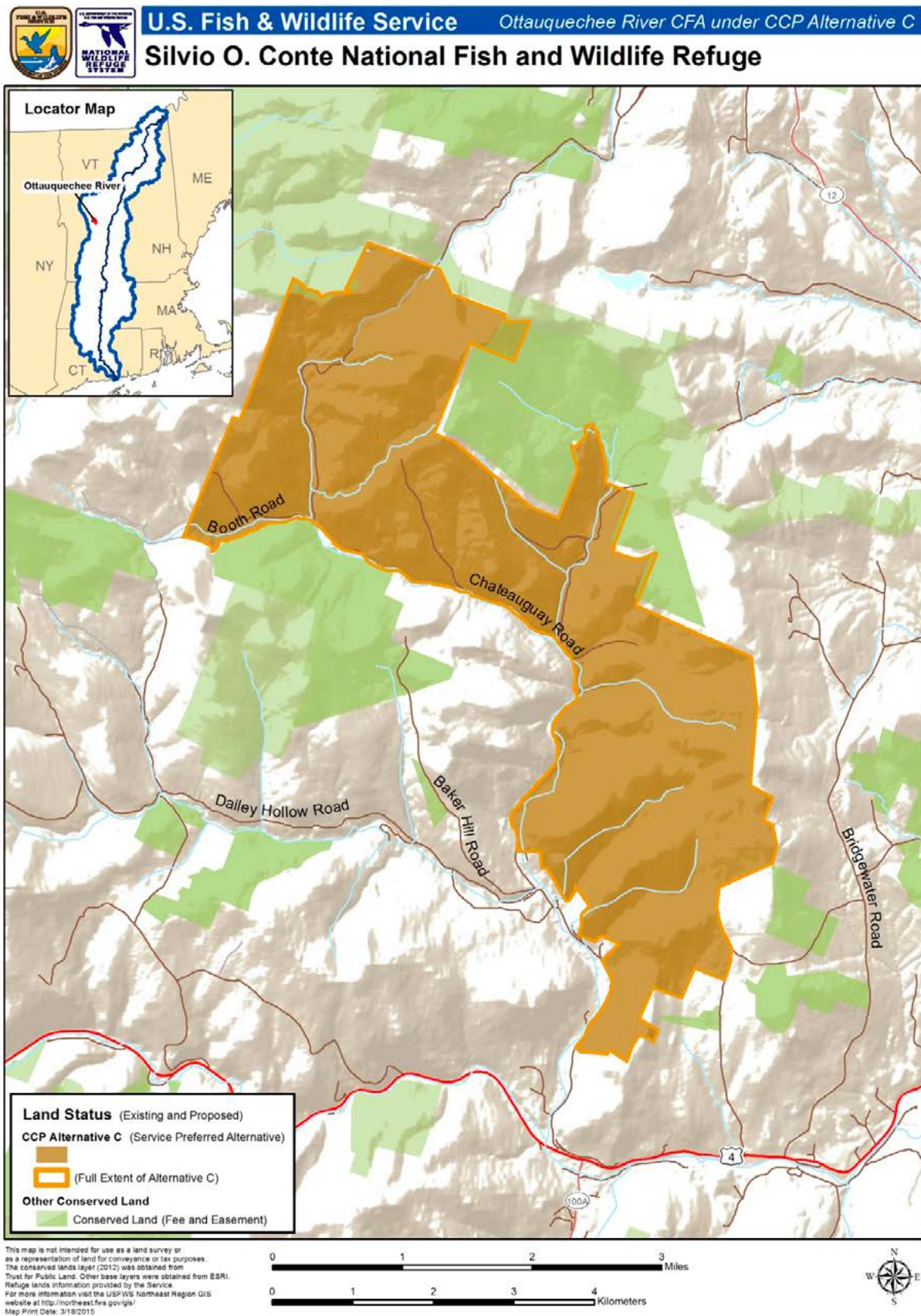
We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (e.g., forested, non-forested and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down HMP. Once inventory has been completed, then management will focus on maintaining the following conditions:

- Forest management activities will provide diversity of seral stages including early successional and mature forested habitats. The forests in the CFA will be structurally diverse and appropriate for site conditions and location.
- In open water (stream, rivers) habitats, we will focus on maintaining forested stream buffers, a structurally diverse instream habitat, and uninterrupted aquatic species passage to spawning and wintering habitat.

What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

The National Wildlife Refuge System Improvement Act of 1997 identified hunting, fishing, wildlife observation, photography, interpretation, and environmental education as priority, wildlife-dependent uses. As such, these uses would receive priority on refuge lands.

Map A.62. Ottauquechee River CFA – Location.



Map A.63. Ottauquechee River CPA/CFA – Habitat Types.

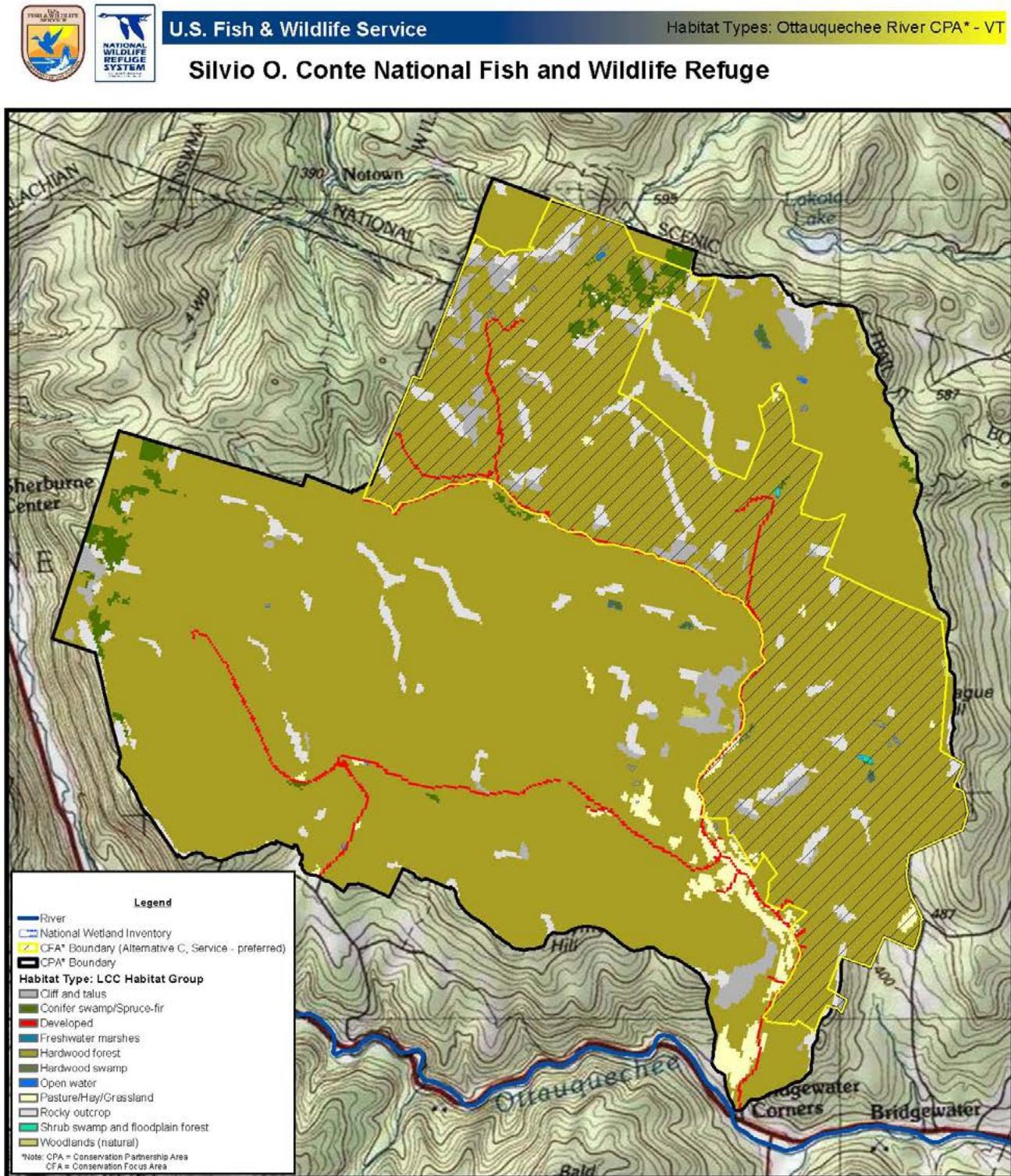


Table A.45. Ottawaquechee River CPA/CFA – Habitat Types.

| LCC General Habitat Type ¹ | CPA ² | | CFA ³ | | | |
|--|------------------|-----------------------------|------------------|----------------------------------|--------------------------|--------------------------|
| | Total Acres | Percent of CPA ⁴ | Total Acres | Conserved by Others ⁵ | USFWS Owned ⁶ | Percent CFA ⁷ |
| Forested Uplands and Wetlands⁹ | | | | | | |
| Conifer swamp/spruce-fir | 256 | 1.4% | 93 | 0 | 0 | 1.6% |
| Hardwood forest | 15,854 | 88.6% | 5,234 | 70 | 0 | 87.5% |
| Hardwood swamp | 3 | 0.0% | 3 | 0 | 0 | 0.0% |
| Shrub swamp and floodplain forest | 4 | 0.0% | 4 | 0 | 0 | 0.1% |
| Woodlands (natural) | 65 | 0.4% | 3 | 0 | 0 | 0.1% |
| <i>Forested uplands and wetlands subtotal</i> | <i>16,181</i> | <i>90.4%</i> | <i>5,337</i> | <i>70</i> | <i>0</i> | <i>89.2%</i> |
| Non-forested Uplands and Wetlands⁹ | | | | | | |
| Cliff and talus | 438 | 2.4% | 200 | 3 | 0 | 3.3% |
| Freshwater marshes | 2 | 0.0% | 2 | 0 | 0 | 0.0% |
| Pasture/hay/grassland | 295 | 1.6% | 38 | 1 | 0 | 0.6% |
| Rocky outcrop | 757 | 4.2% | 338 | 13 | 0 | 5.6% |
| <i>Non-forested uplands and wetlands subtotal</i> | <i>1,492</i> | <i>8.3%</i> | <i>578</i> | <i>17</i> | <i>0</i> | <i>9.7%</i> |
| Inland aquatic habitats⁹ | | | | | | |
| Open Water | 1 | 0.0% | 0 | 0 | 0 | 0.0% |
| <i>Inland aquatic habitats subtotal</i> | <i>1</i> | <i>0.0%</i> | <i>0</i> | <i>0</i> | <i>0</i> | <i>0.0%</i> |
| Other | | | | | | |
| Developed | 228 | 1.3% | 66 | 0 | 0 | 0.7% |
| <i>Other subtotal</i> | <i>228</i> | <i>1.3%</i> | <i>66</i> | <i>0</i> | <i>0</i> | <i>0.7%</i> |
| TOTAL | 17,903 | 100.0% | 9,803 | 152 | 0 | 100.0% |

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Partnership Area

3 - Conservation Focus Area; representing Service - preferred Alternative C

4 - Percentage of the CPA represented by the habitat type

5- Acres in the CFA currently conserved by others (TNC 2012)

6 - Acres in the CFA currently owned by the USFWS

7 - Percentage of the CFA represented by the habitat type

8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C

9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.46. Ottawaquechee River CFA – Preliminary Priority Resources of Concern.

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|---|--|---|
| Forested Uplands and Wetlands⁴ | | |
| Hardwood Forest⁵ - 5,321 acres | | |
| Wood Thrush^{A, B, C} | Breeding habitat includes contiguous mature forests (80+ years old) dominated by deciduous tree species, moist soils, a moderate to dense sub-canopy and shrub density, open forest floor and closed canopy (Roth et al. 1996, Rosenberg et al. 2003). | Baltimore Oriole ^J Black-and-white Warbler ^J Black-billed Cuckoo ^{A, I, J} Broad-winged hawk ^J Rose-breasted Grosbeak ^A Northern Flicker ^{A, J} |
| Chestnut-sided Warbler^{A, B} | Early successional deciduous forested upland and wetland habitat (Dunn et al, 1997, Richardson et al, 1995) | Scarlet Tanager ^J Ruffed Grouse ^{A, I} Whip-poor-will ^{A, I, J} Louisiana Waterthrush Brown Thrasher ^I Blackburnian Warbler ^A Ovenbird^A Eastern Red Bat^I American Redstart ^{A, J} Eastern Wood-pewee ^{A, J} Red-shouldered Hawk ^{I, J} Black-throated Green Warbler ^A Black-throated Blue Warbler ^{A, I} Yellow-bellied Sapsucker ^{A, J} Bobcat ^I Long-tailed Weasel ^I Woodland Vole ^I Black Bear ^I Veery ^{A, I} |
| Little Brown Bat ^{B, E} Tri-colored Bat ^E Northern Long-eared Bat ^E Eastern Small-footed Bat ^E | Caves used for hibernation. Roosting trees located in forested landscapes clustered in stands of large trees with cavities or loose bark. Cliffs, ledges, talus slopes also important for roosting/ nesting. Maternity trees (8"-14" dbh) and travel corridors to water are also important (Degraaf et al, 2001, Darling Guidelines, unpublished). | |
| Conifer Swamp⁵ - 6 acres | | |
| Laurentian-Acadian conifer-hardwood acidic swamp ^H Laurentian-Acadian alkaline conifer-hardwood swamp ^H | The <i>conifer-hardwood acidic swamps</i> occur on mineral soils that are nutrient-poor; there may be an organic top soil horizon, but the substrate is generally not deep peat. These basin wetlands remain saturated for all or nearly all of the growing season, and may have standing water seasonally. There may be some seepage influence, especially near the periphery. Red maple, ash, red spruce (rarely Black spruce), and balsam fir are the most typical trees. The herbaceous and shrub layers tend to be fairly species-poor, and include catberry and ferns of the genus <i>Osmunda</i> . Northern white cedar is a diagnostic canopy species within the <i>alkaline conifer-hardwood swamp</i> . It may dominate the canopy or mixed with other conifers or deciduous trees, most commonly Red maple or Black ash. Red osier dogwood is a common shrub. The herb layer tends to be diverse, and small open areas fed by mineral rich waters may occur within the wetland (Gawler 2008). | Uncommon plant communities within the landscape that contributes to BIDEH* |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|--|--|--|
| Forested Uplands and Wetlands⁴ | | |
| Hardwood Swamp⁵ – 3 acres | | |
| North-Central Appalachian acidic swamp ^H | <i>North-Central Appalachian acidic swamps</i> are found in basins or on gently sloping seepage lowlands. Eastern hemlock is usually present and may be dominant. It is often mixed with deciduous wetland trees such as red maple or black tupelo. Species of the genus <i>Sphagnum</i> are an important component of the moss layer (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |
| Shrub Swamp and Floodplain Forest⁵ – 4 acres | | |
| Laurentian-Acadian wet meadow-shrub swamp ^H | <i>Wet meadow-shrub-swamps</i> are often associated with lakes and ponds, but are also found along streams, where the water level does not fluctuate greatly. They are commonly flooded for part of the growing season but often do not have standing water throughout the season. The size of occurrences ranges from small pockets to extensive acreages. The system can have a patchwork of shrub and grass dominance; typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush. Trees are generally absent and, if present, are scattered (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |
| Woodlands (Natural)⁵ – 3 acres | | |
| Central Appalachian alkaline glade and woodland ^H | The <i>alkaline glade and woodland</i> system consists of woodlands and open glades on thin soil over limestone, dolostone or similar calcareous rock. In some cases, the woodlands grade into closed-canopy forests. Eastern red cedar is a common tree, and chinquapin oak is indicative of the limestone substrate. In the northern periphery of the range, northern white cedar may replace eastern red cedar. Prairie grasses are the dominant herbs; forb richness is often high. Fire is an important natural disturbance vector (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|---|---|--|
| Non-Forested Uplands and Wetlands⁴ | | |
| Rocky Outcrop⁵ – 338 acres | | |
| Northern Appalachian-Acadian rocky heath outcrop ^H | The <i>Northern Appalachian-Acadian rocky heath outcrop</i> system occurs on ridges or summits of erosion-resistant acidic bedrock. The vegetation is patchy, often a mosaic of woodlands and open glades. Red oak and various conifers, including White pine and Red spruce, are characteristic trees. Low heath shrubs, including Sheep laurel, Low-bush blueberry, Black huckleberry, and Black chokeberry are typically present. Exposure and occasional fire are the major factors in keeping the vegetation relatively open (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |
| Freshwater Marshes⁵ - 2 acres | | |
| Laurentian-Acadian freshwater marsh ^H | These freshwater emergent and/or submergent marshes are dominated by herbaceous vegetation. They occur in closed or open basins that are generally flat and shallow. They are associated with lakes, ponds, slow-moving streams, and/or impoundments or ditches. The herbaceous vegetation does not persist through the winter. Scattered shrubs are often present and usually total less than 25% cover. Trees are generally absent and, if present, are scattered. The substrate is typically muck over mineral soil. Vegetation includes common bulrush, narrow-leaf cattail, marsh fern, common jewelweed and sedges (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |
| Cliff and Talus⁵ – 200 acres | | |
| Peregrine Falcon ^{C, G} | Nests on cliffs, ledges, and talus slopes near open habitats including rivers, lakes, and marshes, and lack of human disturbance (DeGraaf et al. 2001). | Uncommon plant community within the landscape that contributes to BIDEH* |
| Pasture/hay/grassland⁵ – 38 acres | | |
| Where appropriate and supported by the local community, restore to forest habitat types | See species composition and structure above. | See species associated with forested habitat types above. |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|---|--|---|
| Inland Aquatic Habitats⁴ | | |
| Open Water⁵ – 1 acre | | |
| Brook Trout^F | Spawning habitat includes clear, well oxygenated cold water lakes/ponds/streams with silt-free rocky substrate, abundant cover, vegetated banks, stable temperatures and stream flow (VTWAP 2005). | Blacknose Shiner ^I Riffle Snaketail ^H Brook Snaketail ^H Zebra Clubtail ^H |
| Atlantic Salmon^{F, G} | Spawn in cold freshwater moving streams w/ coarse clean gravel and adequate food/cover. Migrate in large rivers (VTWAP 2005). | |

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

A: 2008 Bird Conservation Region 14.

B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.

C: 2008 USFWS Birds of Conservation Concern.

D: Federal Threatened and Endangered status as of 2010, including Candidate Species

E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010

F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan

G: Silvio O Conte Refuge Purpose Species.

H: 2008 North East Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

A: 2008 Bird Conservation Region 14.

I: 2005 Vermont Wildlife Action Plan (Species of Greatest Conservation Need)

J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Goals, Objectives, and Strategies for Refuge Lands in the Ottawaquechee River CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forest)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure, and improve landscape connectivity of hardwood forest habitat to support species of conservation concern and aid in climate change adaptation. Management will provide breeding and foraging habitat for priority refuge resources of concern, including wood thrush, chestnut-sided warbler, and cave dwelling bats.

Rationale:

We envision healthy forests within the Ottawaquechee CFA where a diverse seral structure provides suitable breeding and post-breeding habitat conditions for a suite of Vermont's wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010, Fraver et al. 2011).

Hardwood forests within Ottawaquechee CFA are diverse and productive for wildlife, and abundant, high-quality habitat is most certainly available. To date our review of Ottawaquechee habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, and an understanding of forest disturbance and land-use history in New England. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within Ottawaquechee comes exclusively from a reading of forest history in New England—a legacy of intensive past-use that altered the vegetation structure and composition, landscape patterns, and ongoing ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, Bellemare et al. 2002, Hall et al. 2002). Our sub-objective assumes the forests of Ottawaquechee are more homogeneous than those of three centuries earlier, and they include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Goodburn and Lorimer 1998, Foster et al. 1998, Foster 2000a, 2000b, Bellemare et al. 2002, Cogbill et al. 2002, Abrams 2003). Completing a comprehensive forest and habitat inventory post-acquisition will test these assumptions, and aid in identifying stands where a forest management approach that combines passive management with the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and move succession forward to emulate later seral stage characteristics.

For forest birds, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. While our management goals may create a relatively old forest, hardwood forests within Ottawaquechee will contain a variety of patches in different age classes and developmental stages; it is not uniform throughout. This diversity of age classes provides a variety of bird species with a range of nesting and foraging opportunities. Further, finer-scale investigation of forest conditions may identify opportunities to improve age class diversity through the creation of early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like chestnut warbler, a North Atlantic LCC (NALCC) representative species are declining as remaining patches of young forest mature (Sepik et al. 1994, Kelley et al. 2008). Across the CFA, enhanced horizontal structure will provide foraging opportunities for bats, and support other species of conservation concern like ruffed grouse, black-throated blue warbler, American redstart, and black bear.

In a mature forest, many nesting bird species tend to remain within specific vegetation layers: on or near the ground, in the middle layer, or up in the canopy. Ottawaquechee River's hardwood forests should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of nesting and foraging opportunities. These habitat elements may have importance to declining mature forest-interior species identified in regional conservation plans like wood thrush. Wood thrush nest and feed at the ground level; a sub-canopy layer of shrubs, moist soils, and leaf litter are important habitat features (Roth et al. 1996, Rosenberg et al. 2003). And wood thrush has significance as a NALCC representative species for hardwood forests in the NALCC southern sub-region.

Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater than 75 to 80 percent closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like wood thrush. The distribution and concentration of these openings will vary, but interior forest conditions will be maintained on the whole. Closed canopy conditions favor a suite of interior-nesting bird species that include: ovenbird, black-throated blue warbler, black-throated green warbler, and—when along rocky bottomed streams—Louisiana waterthrush.

Efforts to maintain or improve seral stage diversity within the CFA will include the retention of large-diameter (24 inches or greater dbh) trees where appropriate. Such larger trees are either absent or are very few in younger forests, which has implications for wildlife habitats and nutrient cycling. The Ottawaquechee River CFA western boundary is within a mile of the Bridgewater Mines, which were formerly used by more than one hundred hibernating little brown, tricolored, big brown, and northern long-eared bats (see sub-objective 1.2b for further discussion). These mines are no longer being used by bats due to their decimation by white-nose syndrome. Little brown, northern long-eared, tricolored and eastern small-footed bats are undergoing review for listing under the ESA. Little brown bat and tricolored bat are currently being assessed for candidate status, while northern long-eared and eastern small-footed bat have been petitioned for listing under the ESA. Upon emergence from the hibernacula, females will travel to their summer range to give birth to pups in maternity colonies, while male bats often remain within 5 miles of the hibernaculum throughout the summer (Darling, unpublished). Crevices behind peeling bark of large diameter trees or cavities in partially decayed trees are used for maternity colonies and summer day roosts (Caceres and Pybus 1997). Structurally-sound, large-diameter trees are important nest sites for woodland raptors, such as the red-shouldered hawk. Snags and cavity trees also provide important nesting and foraging sites for bird species such as nuthatches, owls, and woodpeckers, like the yellow-bellied sapsucker.

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Identify sites appropriate for early successional management.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Within 10 years of land acquisition and CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices.

- Retain and recruit 3 to 6 large (greater than 16 dbh) live or dead trees such as silver maple, beech, yellow birch, green ash and sugar maple per acre within a 5-mile radius of bat hibernacula as bat roosting sites.
- Create small canopy openings to improve solar exposure of existing or potential roost trees.
- Maintain contiguous late successional forest cover within 2 to 3 miles of rock cliffs and ledges to protect potential roosting sites of eastern small-footed bats.
- Protect hard and soft mast producing species such as American beech inclusions, and apple and cherry trees, through the use of best management practices.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.
- Survey for and protect active maternity colonies and summer roost sites.

Sub-objective 1.1b. (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management

that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Ottawa-Quebec CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity, and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Cliff and Talus)

Protect cliffs, ledges, and talus slopes to maintain the biological integrity, health and diversity of associated natural and rare ecological communities. Emphasis will be on sites occupied by nesting peregrine falcons and roosting bats.

Rationale:

Cliff and talus systems within this CFA occur below treeline at low to mid elevations. The vegetation is patchy and often sparse, punctuated with patches of small trees that may form woodlands in places (Gawler 2008). The type of rock, microclimate, and soil availability from higher elevation sources directly and indirectly influence vegetation within these systems (Thompson and Sorenson 2000). Rock types may include limestone, dolomite, granite, schist, slate, or shale which breakdown differently in the environment providing varying levels of

nutrients, moisture, ground stabilization, and soil availability. Sun exposure, aspect, elevation, and moisture provide different microclimate conditions impacting vegetation type and growth. These systems provide unique niches for rare and uncommon plants, and habitat for snakes, including the rare eastern timber rattlesnake, black rat snake, and eastern garter snake. Exposed cliffs provide nesting habitat for turkey vultures, ravens, porcupines, and peregrine falcons, a state species of greatest conservation need. Peregrine falcons are also a refuge purpose species. Vermont's breeding population has increased steadily since they were extirpated from the eastern US in the mid to late 1960s due to indiscriminate use of DDT following World War II. Peregrines are nesting in Ottauquechee River CFA, and monitoring and management of Vermont's peregrine population is being coordinated by Audubon Vermont.

Bats will use caves or mines within the cliff and talus systems for "hibernacula" where they hibernate, and rock crevices for summer roosting sites. This region hosted two bat hibernacula: two unused mines in Bridgewater. The Bridgewater mines were surveyed in the winter by VFWD between 2009 and 2013. More than one hundred bats were hibernating in each mine, including little brown bats, northern long-eared bats, tri-colored bats, and big brown bats. These mines are no longer being used by bats due to decimation by white-nose syndrome. Although this hibernaculum is about a mile from the CFA boundary, and no longer used by bats at this time, the habitats within the CFA are still significant for roosting, feeding and for potential maternity sites (see sub-objective 1.1a for further discussion).

Conservation of cliff and talus systems in the Ottauquechee River CFA will begin with a comprehensive, multi-scale wildlife and habitat inventory. Wildlife species survival and breeding success is dependent on not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent forest conditions and land uses within the CFA and associated landscape. Baseline information on the condition of cliff and talus systems at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Evaluate and manage human (e.g., recreational) influences, and conduct outreach and education as necessary.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Survey for and protect bat roosting sites.
- Identify historical, active, and potential peregrine falcon nesting sites.
- Coordinate with conservation organizations to conduct spring surveys of identified peregrine falcon nest sites to determine occupancy.
- Work with partners to annually monitor active sites to determine occupancy status and reproductive outcome.

Sub-objective 1.2b. (Pasture/Hay/Grassland)

Manage pasture, hay, and grasslands (where appropriate) for shrub-dependent conservation concern species such as chestnut-sided warbler.

Rationale:

Less than one percent of the Ottauquechee River CFA is typed as pasture, hay, and grassland habitat. These habitat types require active manipulation to inhibit the natural succession of converting to forest. The pasture, hay, and grassland habitats tend to be dominated by grasses. Depending on habitat

patch size, continuity of patches and timing of manipulations, this habitat type will support grassland dependent species such as bobolink and grasshopper sparrow. If these habitats are left unmaintained (e.g. not mowed), they will convert to a mixture of shrubs and grasses providing “old field” habitat for shrub dependent species such as chestnut-sided warbler, prairie warbler and field sparrow.

Many shrubland bird breeding populations occur in high proportions in the northeast, and therefore, are species of conservation responsibility (Dettmers, Randy 2003). For example, over 12% of the chestnut-sided warbler population breeds in BCR 14 (Dettmers, Randy 2006). While there is evidence that southern New England supported a small but significant grassland bird community before European settlement, only a small proportion of grassland breeding bird populations occurs in the northeast (Dettmers and Rosenburg 2000). Maintaining high quality shrubland habitat in this CFA will provide habitat for a higher percentage of species in decline.

Shrubland dominated habitats in the northeast support many species of conservation concern, many of which are a high conservation responsibility for the region, indicating the importance of shrubland habitats to these species in the CFA. Current pasture, hay, and grassland acres can provide quality habitat for these species, if managed appropriately. In order to make an informed management decision, it will be necessary to conduct a comprehensive, multi-scale wildlife and habitat inventory. Baseline information on the condition of these habitats will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to protect and promote farming practices (e.g. haying and pasture of animals) that benefit wildlife and protect water quality.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- As new pasture, hay, and/or grassland habitat is acquired, evaluate its ecological importance to determine if it should be maintained, managed as shrubland or restored to native forest through tree plantings or natural succession.

Sub-objective 1.2c. (Biological Integrity, Biological Diversity, and Environmental Health)

Where and when appropriate, protect, or restore habitats absent an identified species of conservation concern, recognizing the importance of all habitats in contributing to the biological integrity, diversity, and environmental health of refuge lands and the Watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges’ “biological integrity, diversity, and environmental health” (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem’s current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine

filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Ottawaquechee CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, manage water resources and riparian areas to provide cold temperature regimes, substrate diversity, and clear aquatic species passage that benefit priority refuge resources of concern including Eastern brook trout and Atlantic salmon.

Rationale:

The North Branch of the Ottauquechee River flows along the west boundary of Ottauquechee CFA. This branch flows southeastwardly through the towns of Killington and Bridgewater meeting up with the Ottauquechee main stem in Bridgewater Corners. The North Branch provides high quality cold water habitat for brook trout and Atlantic salmon. Brook trout and Atlantic salmon are sensitive to extreme temperature fluctuations, and require water temperatures between 40 to 70 degrees Fahrenheit for spawning, growth, and survival. Brook trout and salmon are a high priority for conservation by the State and the Service's Northeast Region. Other species that occur in the Ottauquechee River CFA include creek chub, white sucker, slimy sculpin, and blacknose dace.

Management of water resources in the Ottauquechee River CFA will focus on providing rivers and streams that provide unimpeded aquatic species passage to spawning and wintering habitat and in-stream habitat that is cold and structurally diverse. Due to our lack of knowledge regarding habitat conditions in the CFA, implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife and habitat inventory. Aquatic species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent forest conditions and land uses within the CFA and associated landscape. Baseline information on the condition of open water habitat will further inform more detailed habitat prescriptions within a required step-down HMP.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to conduct stream assessments to evaluate the physical, chemical, and biological condition of the fish community structure, productivity, and health.
- Work with partners to conduct stream assessments to identify man-made physical barriers (e.g., impassable road crossings, culverts, and dams) to the movement of fish and other aquatic organisms.

Within 10 years of land acquisition and CCP approval:

- Work with partners to implement a remediation plan for identified obstacles to aquatic species passage.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the Ottawaquechee River Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Ottawaquechee River Division as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Ottawaquechee River Division as an outdoor classroom.

Rationale:

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Ottawaquechee River Division as an outdoor classroom.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of environmental education programs.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the Ottawaquechee River Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. At the Nulhegan Basin Division, interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA-compliant trail planned for the site, the Ottawaquechee River Division is well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the Ottawaquechee River Division's habitats and cultural resources.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the Ottawaquechee River Division.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of acquiring sufficient land:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, print and social media, signs, and exhibits) when creating programming for natural and cultural resource interpretation.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the Ottawaquechee River Division.
- Incorporate thematic statements, measureable objectives and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures, i.e., general brochure and bird checklist that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Ottauquechee River Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Ottauquechee River Division would be unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and which provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access, and Infrastructure)

Provide the opportunity for a quality hunting experience following state regulations, except as noted under Strategies below.

Rationale:

The Ottauquechee CFA is a popular area to hunt white-tailed deer, Eastern wild turkey, and small game. Hunting will be allowed on a newly created division, consistent with the final compatibility determination. Retaining hunting opportunities on public lands will ensure this wildlife-dependent recreational activity continues and contribute to the state's population management objectives.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that hunting is a compatible use at the division.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Complete all administrative requirements to officially open to hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Allow hunters access to the refuge outside of the normal division open hours (i.e., 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with Vermont Fish and Wildlife Department to determine whether opportunities exist for state-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with Vermont Fish and Wildlife Department to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge website, at Ottauquechee River Division kiosks, through a friends group, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with Vermont Fish and Wildlife Department to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.
- Offer to host hunter education field courses.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access, and Infrastructure)

Provide quality fishing opportunities at the Ottauquechee River Division after completing all administrative procedures to officially open refuge lands to fishing, based on Vermont Fish and Wildlife Department regulations, and any Division-specific conditions.

Rationale:

The North Branch Ottawaquechee River and Cold Brook exist within the proposed CFA. The North Branch Ottawaquechee River provides quality fishing opportunities for wild brook trout and wild rainbow trout, with large brook trout reported by anglers. Fishing is a popular activity in this area and would continue under Service ownership. Retaining fishing opportunities conforms to historic use on CFA and much of the surrounding land in the area.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Complete all administrative requirements to officially open to fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk to post information on fishing seasons and other notices to visitors.
- The Ottawaquechee River Division would be open daily to all visitors, including anglers, from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters.

Within 5 years of acquiring land with fishable waters:

- Work with the Vermont Fish and Wildlife Department to inventory and assess fish populations on the division.
- Work with the Vermont Fish and Wildlife Department to evaluate potential fishing enhancements along the North Branch Ottawaquechee River.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Fishing is a priority public use and a traditional use in the CFA. If land is acquired, the refuge will make information readily available to interested anglers regarding opportunities to fish on Service-owned land, location of fishable waters, and the available game fish.

Management Strategies:

(These strategies are dependent on land acquisition from willing.)

Within 1 year of acquiring land with fishable waters:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available on the refuge website, at informational kiosks, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography for people of all physical abilities.

Rationale:

Wildlife viewing and photography are priority public uses on national wildlife refuges and a popular recreational activity. Local organizations such as Vermont Audubon chapters and others offer organized field trips to popular natural areas. A new division in this area would offer people the chance to see and photograph wildlife and in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land:

- Allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters and anglers.
- Install an informational kiosk in a conspicuous location to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 5 years of acquiring sufficient land:

- Develop a public access strategy and required planning (i.e., NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring sufficient land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with a friends group and other partners that host events designed to view wildlife on the division.

Rationale:

The entire division would be available for wildlife observation and photography; however, there are steps the refuge can take to enhance the experience. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of acquiring sufficient land:

- Develop interpretive panels for kiosks and trails that describe typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.
- Encourage local schools and groups such as a local chapter of Vermont Audubon and other environmental organizations to offer wildlife-centered trips to the refuge.
- Produce a list of wildlife species and associated habitats and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.

Within 10 years of acquiring sufficient land:

- Develop a public access strategy and required NEPA documentation that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Ottawaquechee River Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional water-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as fishing, boating, and wildlife observation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any water trails (e.g., canoe/kayak trails) that part of a regional or State network for their compatibility.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Ottawaquechee River Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking, wildlife observation, and interpretation. Where appropriate, we will work with these partners to promote, and distribute information about these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that are part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Develop compatible opportunities on the Ottawaquechee River Division that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land:

- Allow dispersed hiking, snowshoeing, and cross-country skiing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Work with users to delineate winter cross-country skiing trails and determine whether a special use permit to manage winter trails is warranted.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.

Within 5 years of acquiring sufficient land:

- Work with Friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge divisions and units.

Overview West River Conservation Focus Area (Proposed)

Londonderry, Windham, Jamaica, Townshend, Newfane, and Wardsboro, Vermont

| Conservation Focus Area (CFA)—Acreage Profile | Acres | Percentage of CFA |
|---|-------------|-------------------|
| Total CFA Acres to be Conserved by Service | 22,020 | 84.8% |
| <ul style="list-style-type: none"> ■ Existing Refuge Ownership in CFA¹ ■ Additional Acres in CFA proposed for Refuge Acquisition² | 0 22,020 | |
| Existing Acres in CFA Permanently Conserved by Others ^{2,3} | 3,945 | 15.2% |
| Total Acres in CFA ^{2,4} | 25,965 | 100 % |

¹Acres from Service's Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

The West River, and its major tributaries, was proposed as an SFA in the 1995 Conte EIS. The CFA is part of a larger high priority area for the State of Vermont because it is a contiguous block of northern hardwood forest and its importance to interior forest birds. The proposed CFA is expected to be resilient to climate change. The proposed West River CFA is located near a large network of conserved lands, including the Green Mountain National Forest, Jamaica State Park, and Townshend State Forest. Additional land protection by the Service in this area will help better connect these conserved lands.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Hardwood Forest – 89.8%
- Shrub Swamps and Floodplain Forest – 0.2%
- Freshwater Marsh – 0.6%

See map A.65 and table A.47 for more detailed habitat information for the CFA.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.48 below, there are 12 Priority Refuge Resources of Concern (PRRC) terrestrial and aquatic species, including one federal listed species that rely upon the diverse habitats in this CFA. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. The refuge will seek to protect and restore (if necessary) these habitat types. Additionally, we recognize the value of this area to numerous state-listed species including mussels and plants, as well as potential habitat for the federal listed dwarf wedge mussel based on historic records. These species and others are discussed further below.

1. Federal Threatened and Endangered Species

The northeastern bulrush, a wetland plant, occurs in isolated small wetlands in the CFA. This species is federally listed, and has adapted to seasonal water fluctuations. Habitat alterations that change the hydrology of a wetland to be consistently wet or dry may have negative consequences for this species. Biologists are currently monitoring known populations, but more information is needed on the habitat

requirements, reproductive strategy, and genetic variability (USFWS 2006). Research, and preventing habitat destruction and deterioration of wetland sites where this plant is found are crucial steps to maintaining these northeastern bulrush populations.

The 1993 Recovery Plan for the species called for protection measures such as land acquisition and conservation easements (USFWS 1993). The 5-year review echoed these recommendations, stating that the highest priority actions are to resurveying populations that have not recently been surveyed, securing protection on public and private lands, conducting periodic surveys of populations to determine trends and threats, and implementing management tools to reduce threats and monitor effectiveness of these actions (USFWS 2008).

The aquatic habitats in the CFA support two candidate species, including American eel and brook floater. American eel enter the Connecticut River as juveniles, and migrate upstream to inhabit streams, lakes, and ponds of the West River CFA. Eels feed in these aquatic habitats until they reach sexual maturity and begin the long migration to their spawning grounds in the Sargasso Sea (ASMFC 2000). Brook floater require rivers and streams with high water quality, and are one among many species of freshwater mussels in the CFA.

2. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA), and habitats along the main stem, receives higher use by migrating landbirds. As birds move north, they disperse beyond the Connecticut River main stem, becoming more evenly distributed in habitats across the watershed (Smith College 2006). The West River CFA not only provides important stopover habitat for migrating landbirds, but breeding habitat as well.

The West River CFA is part of a larger block of unfragmented forest that includes almost 4,000 acres of conserved land. It is characterized by a high quality riverine ecosystem, surrounded by intact forested uplands and productive tributary streams. These habitats provide breeding habitat for a diversity of landbirds including species of conservation concern and forest interior dwelling species. This CFA is in the core range for many of these species including PRRC such as wood thrush, blackburnian warbler, Canada warbler, chestnut-sided warbler, and American woodcock.

3. Waterfowl

Potential breeding and foraging habitat for American black duck, a PRRC species, as well as wood duck, Canada geese, and other waterfowl species within wetlands adjacent to the Townshend Reservoir, West River tributaries and open water habitats.

4. Diadromous fish and other aquatic species

The West River flows through the northern portion of the CFA, and along the eastern boundary as it enters and exits the Townshend Reservoir. The West River has been rated as having the highest abundance of high quality open water habitat as measured by a Vermont Index of Biotic Integrity, a measure of fish community health. It has a wide range of representative reaches extending from its headwaters to its mouth supporting diverse assemblages of fish species. The West River is also considered representative for assemblages of mussels and invertebrates in several locations, including Cobb Brook, which flows through the northern portion of the CFA.

The main stem and tributaries provide high quality cold water habitat for PRRC species, including brook trout and Atlantic salmon. The lower West River provides habitat for warm water species as well as diadromous fish such as American shad and American eel, which are refuge resources of concern. American eel, is petitioned for Federal listing, and spends the majority of its young life in the freshwater systems of the CFA. The West River CFA also provides important aquatic habitat for freshwater mussels, including brook floater, another species petitioned for Federal listing. Sea lamprey, another species of conservation concern, also occurs in this CFA providing important ecological benefits to aquatic systems. Other species that occur in the West River CFA include yellow perch, creek chub, white sucker, pumpkinseed, carp, slimy sculpin and blacknose dace. These species are hosts for the earliest life stages of resident mussels.

The Townshend Reservoir is located in the northern portion of the CFA. This man-made lake is associated with the Townshend Dam, which was built on the West River in 1961 by the U.S. Army Corps of Engineers to prevent flooding along the Connecticut River. This lake is managed by Vermont Fish and Wildlife Department and the Army Corps of Engineers, and supports rainbow, brown and brook trout, yellow perch, largemouth bass and bullhead.

5. Wetlands

The West River CFA contains 118 acres of hardwood swamp, 34 acres of conifer swamp, 54 acres shrub-swamp and floodplain forest, and 163 acres of freshwater marsh. Many of these wetlands are associated with slow moving streams or small ponds. The largest wetland patch, 45 acres of hardwood swamp, occurs near the Townsend Reservoir. Some of the freshwater marshes contain the Federal listed northeastern bulrush.

6. Other

In addition to the federally endangered northeastern bulrush mentioned above, there is potential habitat for cobblestone tiger beetle, a species that has been petitioned for federal listing, within the West River CFA. This tiger beetle prefers sparsely vegetated sandy cobble beaches (Pyzikiewicz 2005). The West River provides these habitat conditions, and the cobblestone tiger beetle has been found in the watershed. This tiger beetle is a PRRC species, and listed as state-endangered. Other species of concern that occur in the West River watershed (not necessarily in the CFA) include the State-threatened brook floater mussel and eastern pearlshell, eleven State rare plant species, as well as historic records of the federally listed dwarf wedgemussel. The brook floater is petitioned for Federal listing, and therefore, is also a PRRC species.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

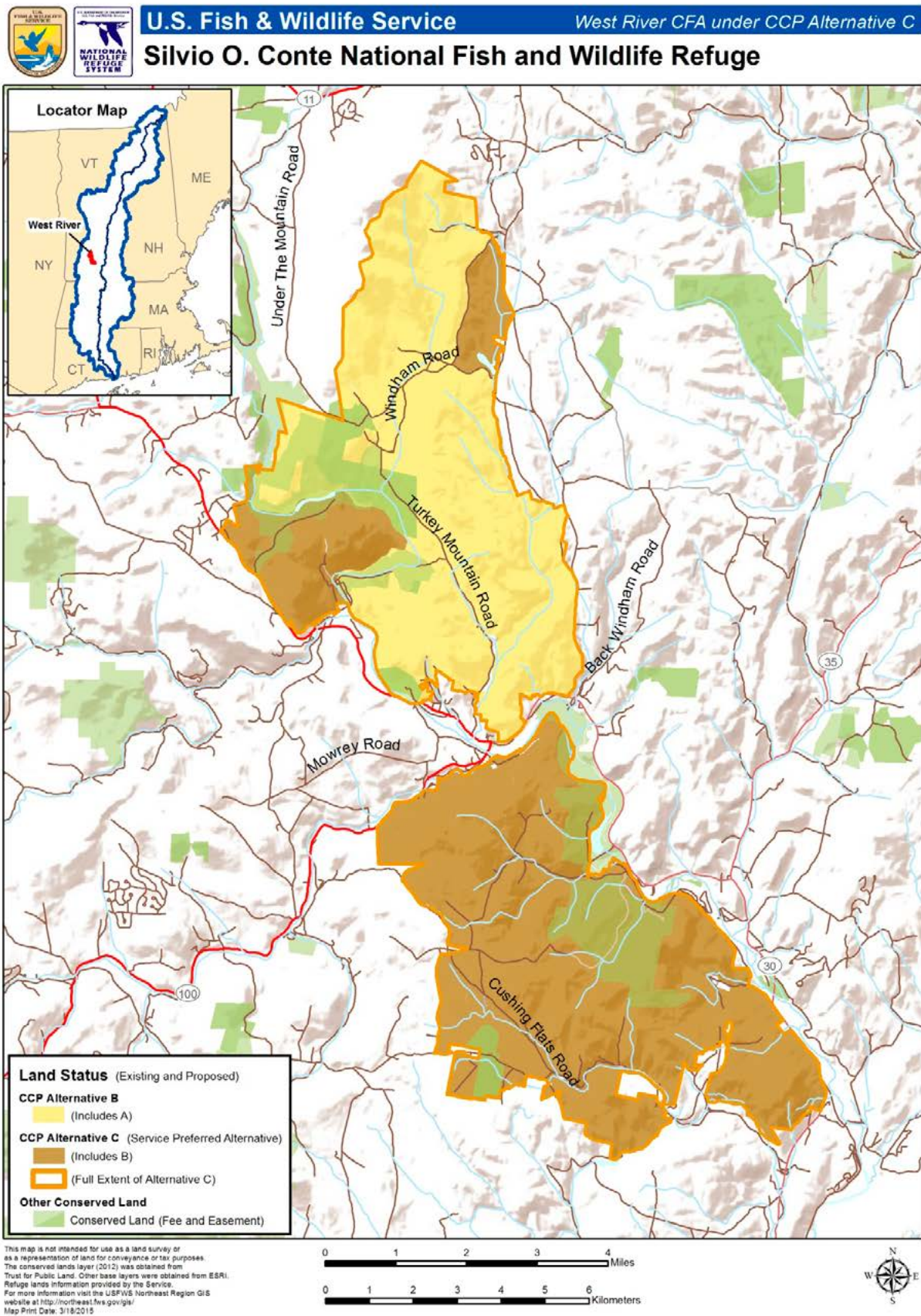
We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (i.e., forested, non-forested and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down Habitat Management Plan (HMP). Once inventory has been completed, then management will focus on maintaining the following conditions:

- Forest management activities will provide a diversity of seral stages including early successional and mature forested habitats. The forests in the CFA will be structurally diverse and appropriate for site conditions and location. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Non-forest management activities will occur within wetland habitats, and pasture, hay, grassland habitats. Wetland management will focus on maintaining the natural hydrology and native species composition. Invasive plant management will be a priority.
- In open water (stream, rivers, and ponds) habitats, we will focus on maintaining forested stream buffers, a structurally diverse in-stream habitat, and uninterrupted aquatic species passage to spawning and wintering habitat.

What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

The National Wildlife Refuge System Improvement Act of 1997 identified hunting, fishing, wildlife observation, photography, interpretation, and environmental education as priority, wildlife-dependent uses. As such, these uses would receive priority on refuge lands.

Map A.64. West River CFA – Location.



Map A.65. West River CPA/CFA – Habitat Types.

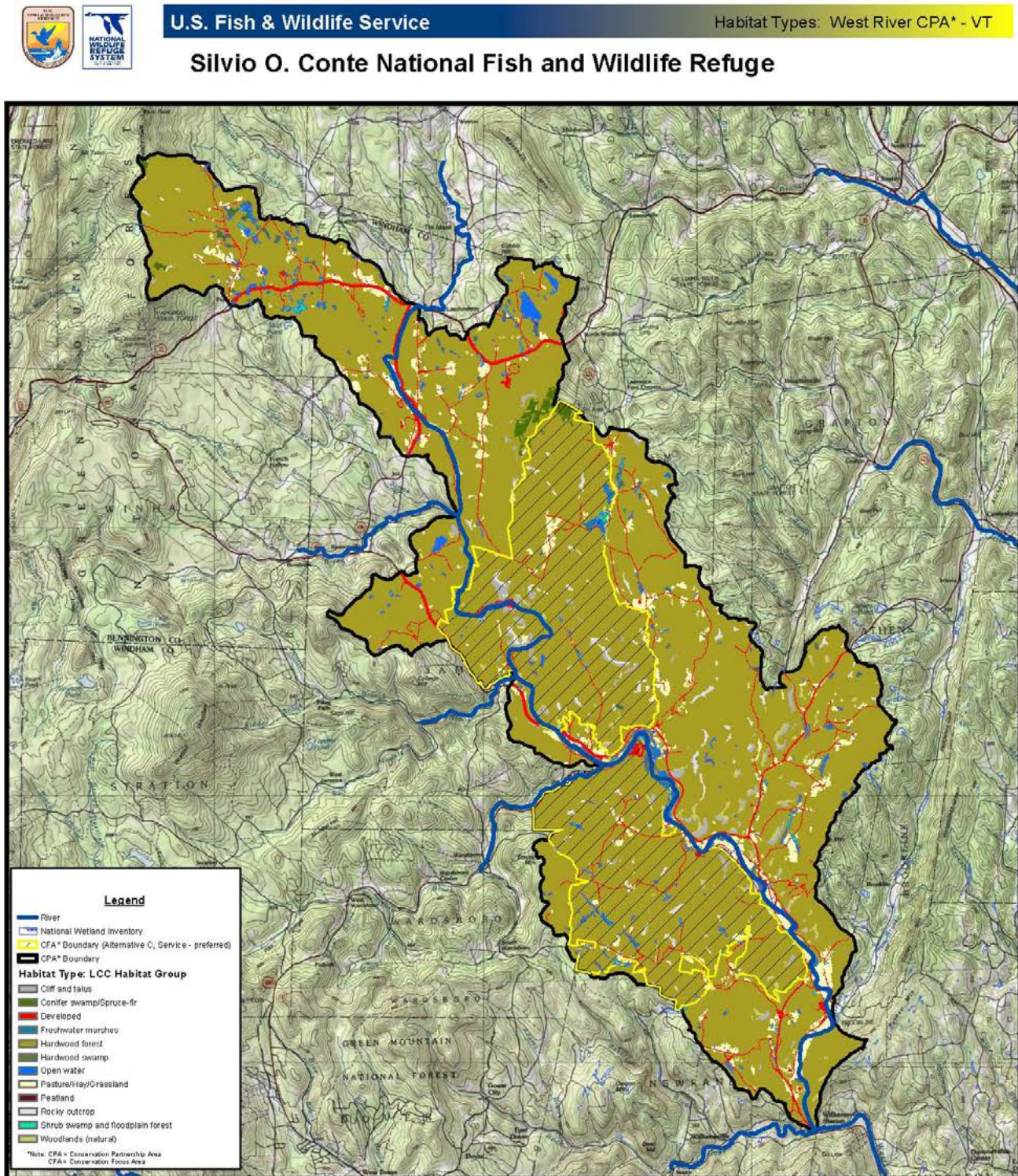


Table A.47. West River CPA/CFA – Habitat Types.

| LCC General Habitat Type ¹ | CPA ² | | CFA ³ | | | |
|--|------------------|-----------------------------|------------------|----------------------------------|--------------------------|--------------------------|
| | Total Acres | Percent of CPA ⁴ | Total Acres | Conserved by Others ⁵ | USFWS Owned ⁶ | Percent CFA ⁷ |
| Forested Uplands and Wetlands⁹ | | | | | | |
| Conifer swamp/spruce-fir | 776 | 1.0% | 130 | 6 | 0 | 0.5% |
| Hardwood forest | 69,355 | 85.0% | 23,442 | 3,364 | 0 | 89.8% |
| Hardwood swamp | 486 | 0.6% | 118 | 89 | 0 | 0.5% |
| Shrub swamp and floodplain forest | 309 | 0.4% | 54 | 4 | 0 | 0.2% |
| Woodlands (natural) | 532 | 0.7% | 144 | 48 | 0 | 0.6% |
| <i>Forested uplands and wetlands subtotal</i> | <i>71,458</i> | <i>87.5%</i> | <i>23,888</i> | <i>3,510</i> | <i>0</i> | <i>91.6%</i> |
| Non-forested Uplands and Wetlands⁹ | | | | | | |
| Cliff and talus | 983 | 1.2% | 463 | 175 | 0 | 1.8% |
| Freshwater marshes | 428 | 0.5% | 163 | 31 | 0 | 0.6% |
| Pasture/hay/grassland | 3,832 | 4.7% | 488 | 13 | 0 | 1.9% |
| Peatland | 10 | 0.0% | 1 | 0 | 0 | 0.0% |
| Rocky outcrop | 860 | 1.1% | 383 | 53 | 0 | 1.5% |
| <i>Non-forested uplands and wetlands subtotal</i> | <i>6,112</i> | <i>7.5%</i> | <i>1,498</i> | <i>272</i> | <i>0</i> | <i>5.7%</i> |
| Inland aquatic habitats⁹ | | | | | | |
| Open Water | 625 | 0.8% | 127 | 74 | 0 | 0.5% |
| <i>Inland aquatic habitats subtotal</i> | <i>625</i> | <i>0.8%</i> | <i>127</i> | <i>74</i> | <i>0</i> | <i>0.5%</i> |
| Other | | | | | | |
| Developed | 3,432 | 4.2% | 579 | 99 | 0 | 2.2% |
| <i>Other subtotal</i> | <i>3,432</i> | <i>4.2%</i> | <i>579</i> | <i>99</i> | <i>0</i> | <i>2.2%</i> |
| TOTAL | 81,627 | 100.0% | 26,091 | 3,955 | 0 | 100.0% |

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Partnership Area

3 - Conservation Focus Area; representing Service - preferred Alternative C

4 - Percentage of the CPA represented by the habitat type

5- Acres in the CFA currently conserved by others (TNC 2012)

6 - Acres in the CFA currently owned by the USFWS

7 - Percentage of the CFA represented by the habitat type

8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C

9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.48. West River CFA – Preliminary Priority Resources of Concern.

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|---|---|---|
| Forested Uplands and Wetlands⁴ | | |
| Hardwood Forest⁵ - 23,537 acres | | |
| Wood Thrush^{A, B, C} | Breeding habitat includes contiguous mature forests (80+ years old) dominated by deciduous tree species, moist soils, a moderate to dense sub-canopy and shrub density, open forest floor and closed canopy (Roth et al. 1996, Rosenberg et al. 2003). | Baltimore Oriole ^J Black-and-white Warbler ^J Black-billed Cuckoo ^{A, I, J} Northern Flicker ^{A, J} Scarlet Tanager ^J Ruffed Grouse ^{A, I} Whip-poor-will ^{A, I, J} |
| American Woodcock ^{A, B, C} | Breeding and roosting habitat includes young deciduous and mixed forests (1-20 years old) dominated by aspen and birch, and 3+ acre forest openings with 60% shrub cover; in proximity to alder wetlands and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994). | Louisiana Waterthrush Brown Thrasher ^I Ovenbird^A Eastern Red Bat^I American Redstart ^{A, J} Blackburnian Warbler ^A Eastern Wood-pewee ^{A, J} Red-shouldered Hawk ^{I, J} Black-throated Green Warbler ^A Sharp-shinned Hawk ^J |
| Chestnut-sided Warbler^{A, B, I} | Early successional deciduous forested upland and wetland habitat (Dunn et al, 1997, Richardson et al, 1995) | Yellow-bellied Sapsucker ^{A, J} Rose-breasted Grosbeak ^A Northern Parula ^A Bobcat ^I Long-tailed Weasel ^I Woodland Vole ^I Black Bear ^I Veery ^{A, I} Black-throated Blue Warbler ^{A, I} Purple Finch ^A |
| Blackburnian Warbler ^A | Breeding habitat includes mature conifer, and conifer-deciduous forests (80+ years old) (De-graaf et al. 2001, Hodgman et al. 2000, Dunn et al. 1997, Morse 2004). | |
| Canada Warbler ^{A, B, C} | Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997). | |
| Hardwood Swamp⁵ - 118 acres | | |
| Canada Warbler ^{A, B, C} | Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997). | Northern Waterthrush Red-shouldered Hawk ^{I, J} Rose-breasted Grosbeak ^{A, J} Veery ^{A, I, J} White-eyed Vireo ^J Willow Flycatcher ^J Wood Duck ^{A, J} Northern Parula ^A |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|--|--|--|
| Forested Uplands and Wetlands⁴ | | |
| Conifer Swamp⁵ - 34 acres | | |
| Laurentian-Acadian conifer-hardwood acidic swamp ^H Laurentian-Acadian alkaline conifer-hardwood swamp ^H | The <i>conifer-hardwood acidic swamps</i> occur on mineral soils that are nutrient-poor; there may be an organic top soil horizon, but the substrate is generally not deep peat. These basin wetlands remain saturated for all or nearly all of the growing season, and may have standing water seasonally. There may be some seepage influence, especially near the periphery. Red maple, ash, red spruce (rarely Black spruce), and balsam fir are the most typical trees. The herbaceous and shrub layers tend to be fairly species-poor, and include catberry and ferns of the genus <i>Osmunda</i> . Northern white cedar is a diagnostic canopy species within the <i>alkaline conifer-hardwood swamp</i> . It may dominate the canopy or mixed with other conifers or deciduous trees, most commonly Red maple or Black ash. Red osier dogwood is a common shrub. The herb layer tends to be diverse, and small open areas fed by mineral rich waters may occur within the wetland (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |
| Shrub Swamp and Floodplain Forest⁵ - 54 acres | | |
| American Woodcock ^{A, B, C} | Foraging habitat includes alder dominated wetlands in proximity to early successional forests, shrublands and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994). | Chestnut-sided Warbler ^{A, I} Black Racer ^I Ruffed Grouse ^{A, I} Eastern Ribbon Snake ^{I, J} |
| American Black Duck ^{A, B, C, G} | Breeding and migrating habitat includes herbaceous wetlands, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001). | Warbling Vireo Willow Flycatcher Wood Turtle^I American Redstart ^{A, J} Eastern Kingbird ^J Gray Catbird ^J Wood Duck ^{A, J} Veery ^{A, I} |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|--|---|--|
| Forested Uplands and Wetlands⁴ | | |
| Woodlands (natural)⁵ - 144 acres | | |
| Central Appalachian pine-oak rocky woodland ^H Central Appalachian alkaline glade and woodland ^H | <i>The pine-oak rocky woodland system</i> encompasses open or sparsely wooded hilltops and outcrops or rocky slopes. The substrate rock is granitic or of other acidic lithology. The vegetation is patchy, with woodland as well as open portions. Pine species are indicative and often are mixed with Oak species. Some areas have a fairly well-developed heath shrub layer, others a grass layer. Conditions are dry and nutrient-poor, and many, if not most, sites have a history of fire. The <i>alkaline glade and woodland system</i> consists of woodlands and open glades on thin soil over limestone, dolostone or similar calcareous rock. In some cases, the woodlands grade into closed-canopy forests. Eastern red cedar is a common tree, and chinquapin oak is indicative of the limestone substrate. In the northern periphery of the range, northern white cedar may replace eastern red cedar. Prairie grasses are the dominant herbs; forb richness is often high. Fire is an important natural disturbance vector. (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |
| Non-Forested Uplands and Wetlands⁴ | | |
| Rocky Outcrop⁵ – 383 acres | | |
| Northern Appalachian-Acadian rocky heath outcrop ^H | The Northern Appalachian-Acadian rocky heath outcrop system occurs on ridges or summits of erosion-resistant acidic bedrock. The vegetation is patchy, often a mosaic of woodlands and open glades. Red oak and various conifers, including White pine and Red spruce, are characteristic trees. Low heath shrubs, including Sheep laurel, Low-bush blueberry, Black huckleberry, and Black chokeberry are typically present. Exposure and occasional fire are the major factors in keeping the vegetation relatively open (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|--|---|---|
| Non-Forested Uplands and Wetlands⁴ | | |
| Freshwater Marshes⁵ - 163 acres | | |
| American Black Duck ^{A, B, C, G} | Breeding and migrating habitat includes herbaceous wetlands, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001). | Canada Goose ^J Tapering Rush ^I Greene's Rush ^J Mallard ^J |
| Northeastern Bulrush ^{B, D} | Inhabits herbaceous wetlands with seasonally fluctuating waterlevels (USFWS, 2006) | Northern Harrier ^{A,I,J} Clustered Sedge ^I Great Blue Heron ^I American Bittern ^{A,I} Grass Rush ^I Water Shrew ^I Arrowleaf ^I Wood Duck ^J |
| Peatlands – 1 acre | | |
| Laurentian-Acadian acidic alkaline fen ^H | <i>Laurentian-Acadian acidic alkaline fens</i> are most abundant in areas of limestone bedrock, and widely scattered in areas where calcareous substrates are scarce. Shore fens, which are peatlands that are occasionally flooded along stream and lakeshores, are also included here because flooding tends to create moderately alkaline conditions. The vegetation may be grass-dominated, shrub-dominated, or a patchwork of the two; shrubby cinquefoil is a common diagnostic shrub. The herbaceous flora is usually species-rich and includes calcium loving grasses and forbs. Sphagnum dominates the substrate; star campylium moss is an indicator bryophyte. The edge of the basin may be shallow to deep peat over a sloping substrate, where seepage waters provide nutrients (Gawler 2008). | uncommon plant community within the landscape that contributes to BIDEH* |
| Pasture/Hay/Grassland⁵ – 488 acres | | |
| American Woodcock ^{A, B, C} | Roosting habitat includes old fields with scattered tall herbaceous vegetation and/or shrubs. Herbaceous openings such as log landings and pasture used for singing grounds (Kelley et al. 2008, Sepik et al. 1994). | Field Sparrow ^J Northern Harrier ^{A,I,J} Chestnut-sided Warbler ^{A,I} Bobolink ^{A,I} Grasshopper Sparrow ^I Eastern Meadowlark ^I |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|---|---|---|
| Non-Forested Uplands and Wetlands⁴ | | |
| Cliff and Talus⁵ – 463 acres | | |
| <p>Laurentian-Acadian acidic cliff and talus^H</p> <p>North-central Appalachian acidic cliff and talus^H</p> <p>North-central Appalachian circum-neutral cliff and talus^H</p> <p>Laurentian-Acadian calcareous cliff and talus^H</p> | <p>These cliff systems occur at low to mid elevations, well below treeline. The vegetation within the <i>Laurentian-Acadian acidic cliff and talus system</i> is patchy and often sparse, punctuated with patches of small trees such as birches and spruce species. Species that prefer calcium rich soils are absent. In north-facing or other sheltered settings where cold air accumulates at the bottom of slopes, a shrubland of heaths and reindeer lichens can develop. The <i>North Central Appalachian acidic cliff and talus system</i> comprises sparsely vegetated to partially wooded cliffs. Most of the substrate is dry and exposed, but small (occasionally large) areas of seepage are often present. Vegetation in seepage areas tends to be comparatively well-developed and different from the surrounding dry cliffs. The vegetation is patchy and often sparse, punctuated with patches of small trees that may form woodlands in places. Eastern red cedar is a characteristic tree species, poison ivy a characteristic woody vine, and common polypody a characteristic fern. Substrates within the <i>circumneutral cliff and talus system</i> include limestone, dolomite and other rocks. The vegetation varies from sparse to patches of small trees, in places forming woodland or even forest vegetation. Ash, basswood, and American bladdernut are woody indicators of the enriched setting. The herb layer includes at least some species that are indicators of enriched conditions, e.g., yellow jewelweed, purple cliffbrake, ebony spleenwort, or bluntlobe cliff fern. The <i>calcareous cliff and talus system</i> has more nutrient rich soils, and the vegetation is often sparse, but may include patches of small trees including northern white cedar, which may be the dominate species. Ash species and basswood are woody indicators of the enriched setting (Gawler 2008).</p> | <p>Uncommon plant community within the landscape that contributes to BIDEH*</p> |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|---|--|--|
| Inland Aquatic Habitats⁴ | | |
| Water⁵ – 127 acres | | |
| Brook Floater ^E | Inhabits creeks and small rivers, prefers the stable bank conditions afforded by gravel or sandy substrates, and good water quality (Nedean et al. 2000). | Eastern Pearlshell ^I Wood Turtle ^I Boulder-beach Tiger Beetle ^I Riffle Snaketail ^I Brook Snaketail ^I Zebra Clubtail ^I |
| Atlantic Salmon ^{B, F, G} | Spawn in cold freshwater moving streams w/ coarse clean gravel and adequate food/cover. Migrate in large rivers (VTWAP 2005). | |
| Brook Trout ^F | Spawning habitat includes clear, well oxygenated cold water lakes/ponds/streams with silt-free rocky substrate, abundant cover, vegetated banks, stable temperatures and stream flow (VTWAP 2005). | |
| American Shad ^{B, F, G} | Spawn when the water temperature is above 60° F in shoal area of river and lower reaches of larger tributaries (USFWS 1996). | |
| American Eel ^{E, F} | Migrating and feeding habitat includes lakes, streams and large rivers (USFWS 1996) | |
| Cobblestone Tiger-beetle ^E | Breeding and wintering habitat includes sparsely vegetated sandy cobble beaches on the banks or upstream side of islands in free-flowing rivers (Pyzikiewicz 2006). | |

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

A: 2008 Bird Conservation Region 14.

B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.

C: 2008 USFWS Birds of Conservation Concern.

D: Federal Threatened and Endangered status as of 2010, including Candidate Species

E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010

F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan

G: Silvio O Conte Refuge Purpose Species.

H: 2008 North East Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

A: 2008 Bird Conservation Region 14.

I: 2005 Vermont Wildlife Action Plan (Species of Greatest Conservation Need)

J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Objectives and Strategies for Refuge Lands in the West River CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forests)

Improve the diversity of seral stages, (where and when possible) to restore historic composition and structure, and improve landscape connectivity of hardwood forests to facilitate climate change adaptation and support species of conservation concern. In particular, habitat management will provide breeding and foraging habitat for priority refuge resources of concern including wood thrush, Canada warbler, blackburnian warbler, chestnut-sided warbler and American woodcock.

Rationale:

We envision healthy forests within the West River CFA where a diverse seral structure provides suitable breeding and post-breeding habitat conditions for a suite of Vermont's wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010, Fraver et. al 2011).

The watershed of the West River is almost entirely forested, contributing to the high quality of its terrestrial and aquatic systems: rivershore grasslands, riverside outcrops, submerged beds of aquatic plants—including the rare riverweed, cold headwater streams, floodplain forests, northern hardwood forests, hemlock swamps, vernal pools and beaver ponds/meadows in various stages of succession. To date, our review of West River's habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, and an understanding of forest disturbance and land-use history common to larger New England. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within West River comes exclusively from a reading of forest history in New England—a legacy of intensive past-use that altered the vegetation structure and composition, landscape patterns, and ongoing ecological dynamics (Cronon 1983; Whitney 1996; Foster et al. 1997; Bellemare et al. 2002; Hall et al. 2002). Our sub-objective assumes the forests of West River are more homogeneous than those of three centuries earlier, and they include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Foster et al. 1998; Foster 2000; Goodburn and Lorimer 1998; Cogbill 2002; Bellemare et al. 2002; Abrams 2003). Completing a comprehensive forest and habitat inventory post-acquisition will test these assumptions, and aid in identifying stands where a forest management approach that combines passive management; the application of silvicultural treatments designed to emulate gap dynamics; and the creation of early successional forests, will promote compositional and structural diversity, and broadly move succession forward to emulate later seral stage characteristics.

For forest birds, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. While our management goals may create a relatively old forest, hardwood forests within West River will contain a variety of patches in different age classes and developmental stages; it is not uniform throughout. This diversity of age classes provides a variety of bird species with a range of nesting and foraging opportunities. Further, finer-scale investigation of forest conditions may identify opportunities to improve age class diversity through the creation of early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like American woodcock, are declining as remaining patches of young forest mature (Kelley et al. 2008, Sepik et al. 1994). Across

the CFA, enhanced horizontal structure should support other species of conservation concern like chestnut-sided warbler, ruffed grouse, and—if wetlands and riparian areas are present—Canada warbler (Reitsma et al. 2008, Lambert et al. 2005, Chace et al. 2009).

In a mature forest, many nesting bird species tend to remain within specific vegetation layers: on or near the ground, in the middle layer, or up in the canopy. West River's hardwood forests should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of nesting and foraging opportunities. Patches of very dense native shrub and understory layers (0-5 feet in height) are of particular importance to species like Canada warbler. These habitat elements may have importance to declining mature forest-interior species identified in regional conservation plans like wood thrush and Blackburnian warbler. Wood thrush nest and feed at the ground level; a sub-canopy layer of shrubs, moist soils, and leaf litter are important habitat features (Roth et al. 1996, Rosenberg et al. 2003). And wood thrush has significance as a NALCC representative species for hardwood forests in the NALCC southern sub-region. Improving vertical diversity by preserving softwood inclusions during forest management may provide an important habitat component for Blackburnian warblers, who dwell in the upper canopies of conifers, and are thought to be strongly associated with the hemlock forests within West River. Blackburnian warblers have been shown to decline in response to removal of hemlock by hemlock wooly adelgid (Tingley et al. 2002).

Our active forest management efforts will aim to create or maintain a canopy that is generally closed (>75-80% closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like wood thrush. The distribution and concentration of these openings will vary, but interior forest conditions will be maintained on the whole. Close canopy conditions favor a suite of interior-nesting bird species that include: ovenbird, black-throated green warbler, and—when along rocky bottomed streams—Louisiana waterthrush.

Efforts to maintain or improve seral stage diversity within the CFA will include the retention of large-diameter (24 inches or greater dbh) trees where appropriate. Such larger trees are either absent or are very few in younger forests, and that has implications for wildlife habitat and nutrient cycling. Structurally-sound, large-diameter trees are important nest sites for woodland raptors, such as the red-shouldered hawk. Standing trees that are dead and/or contain cavities will be present in all size classes for those species, like black bear, that require large logs or trees for their dens (Wynne and Sherburne 1984, Chapin et al. 1997, DeGraaf and Yamasaki 2001). Snags and cavity trees also provide important nesting and foraging sites for bird species such as nuthatches, owls, and woodpeckers, like the yellow-bellied sapsucker.

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Work with partners, including the State in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.
- Identify forest stands where soils and species composition will support woodcock management.

Within 10 years of land acquisition and CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices.

- Protect hard and soft mast producing species such as American beech inclusions, and apple and cherry trees, through the use of best management practices.
- Where appropriate maintain larger diameter trees to provide future snags and downed coarse woody debris.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.
- Monitor habitats to ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.

Sub-objective 1.1b. (Hardwood Swamps)

Improve the diversity of seral stages, (where and when possible) restore historic composition and structure, and improve the natural hydrology to support natural and rare ecological communities. Management will provide breeding and foraging habitat for priority refuge resources of concern including Canada warbler.

Rationale:

Of the forest types within the West River Conservation Focus Area (CFA), hardwood swamps frequently have been altered and have potential for restoration. This habitat type in West River is found in small patches where soils have an impermeable or nearly impermeable clay layer that can create a shallow, perched water table. Saturation can vary, with ponding of water common during wetter seasons and drought during the summer or autumn months. The dynamic nature of the watertable drives complexes of forest upland and wetland species including pin oak, red maple, sweetgum, and black gum. Within the Connecticut River watershed, including the CFA, agricultural practices, and selective logging have largely removed this habitat from the landscape, or greatly simplified its historic species composition (Foster 1992; Foster 2000). Changes in hydrology, water pollution, invasive species introductions, and soil compaction remain as threats.

Successional trends in hardwood swamps are not well understood. One possibility is that these areas were once in softwoods such as hemlock, fir, cedar, or spruce. Heavy cutting and clearing for agriculture often eliminated softwood species. Our conservation efforts within West River will focus on promoting the ecological integrity of these stands through restoration of degraded floodplains, and (where and when possible) restoring composition and structure to accepted historical conditions. Where appropriate, restoration of the primary natural disturbance mechanism (seasonal flooding) will aid in the restoration of historical species mixtures.

Restoration of forest habitats and riparian areas will create high-quality habitat for neotropical migratory birds. Closed canopy deciduous forests that include pin oak and other hardwoods provide mast and other foraging sites. Hardwood swamp stands with large average stand diameters, a variety of tree conditions (including large-diameter dead stems, live trees with hollow stems and dead limbs, and small diameter suppressed and dying stems), and nearby water have a high habitat potential for cavity-dwelling wildlife species (DeGraaf et al. 2006).

Many species of conservation concern use forested swamps, including northern parula, willow flycatcher, white-eyed vireo, and rose-breasted grosbeak. Canada warbler, a priority refuge resource of concern, occupies this habitat type with high densities occurring in mixed forested swamps (Reitsma et al. 2008, Lambert et al. 2005, Chace et al. 2009). The wet soil conditions in swamps limit the canopy closure, and frequent blow downs create canopy gaps. This provides a well developed shrub layer—an important habitat component for foraging and nest cover (Chace et al. 2009). Canada warbler shows area sensitivity

in forests fragmented by suburban sprawl (Robbins et al. 1989). Hardwood swamps in the West River CFA are within a matrix of contiguous forest, where fragmentation is not a concern. Hardwood swamp patches of ten acres or greater are thought to provide suitable breeding habitat for Canada warbler in the West River CFA, and allow monitoring of population response to management actions (R. Dettmers personal communication 2013).

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood swamps at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Evaluate hydrologic regime to inform restoration efforts.
- Identify forest stands where management is necessary to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Work with partners, including the State of Vermont, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management.

Within 10 years of land acquisition and CCP approval:

- Implement identified forest management opportunities to improve species composition.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Map vernal pools and seeps.
- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1c. (Shrub Swamps and Floodplain Forest)

Manage shrub swamp and floodplain forest communities to support natural and rare ecological communities, and provide potential breeding and foraging habitat for priority refuge resources of concern including American woodcock and American black duck.

Rationale:

Shrub swamps are restricted to poorly drained areas, small seepage zones, and wide alluvial stretches of rivers and small streams. Shrubs tend to dominate the wetland, though grasses may be present. Typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush (Gawler 2008). These wetlands are also created through beaver activity, a natural and important disturbance process within the CFA. The landscape mosaic of flooded areas and ponds in various stages of succession provide a diversity of plant communities, and habitats for a variety of wildlife species, including American woodcock and American black duck, priority refuge resources of concern.

American woodcock are dependent on early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like American woodcock, are declining as remaining patches of young forest mature. Woodcock require varying habitat conditions that are within close proximity of each other, including clearings for courtship, forest openings with sparse shrub or herbaceous cover for roosting, young deciduous forests of shade intolerant tree species for nesting and brood rearing, and functional foraging areas (Kelley et al. 2008, Sepik et al. 1994). Shrub swamps in the CFA may provide moist, rich soils for foraging and the dense shrubs provide cover from predators

Management of the shrub swamp communities may be required to maintain shrub dominance and stem densities. Tree species, such as red maple, tend to replace mature shrub species and established invasive plants compete for nutrients and space. These invading species require management in order to maintain the native shrub diversity of the community. A high shrub stem density is also important as it provides birds with cover from predators and more leaf surface area for gleaning. Cover for American woodcock, for example, is ideal in a 10-15 year old shrub swamp (USDA 2001). Shrub species, in particular alder, tend to die back as they reach maturity, and as a result stem density decreases. Periodic rejuvenation of shrubs is necessary to maintain required stem densities. Management priority will be given to shrub swamps that are part of a woodcock management area. Management of these shrub swamps will benefit other species that use these communities, including willow flycatcher, American redstart, chestnut-sided warbler, ruffed grouse, black racer, and eastern ribbon snake.

American black ducks also use shrub swamp communities, though black ducks prefer shrub swamps that are flooded or adjacent to open water habitats. Black ducks rely on these wetlands during the breeding season and as stopover habitat during migration. Adults and their broods forage on seeds, aquatic vegetation, and invertebrates in flooded shrub swamp communities, or adjacent open water habitats. Adults place well-concealed nests near foraging habitat in nearby uplands or dry hummocks in the wetland (Longcore et al. 2000, DeGraaf et al. 2001). American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 14. Protecting and managing these shrub wetland communities from potential threats, including invasive species introduction, altered hydrology, and fragmentation, will contribute to the conservation of this species.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of shrub swamps at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1d. (Biological Integrity, Biological Diversity, and Environmental Health)

Where and when appropriate, protect, or restore habitats absent an identified species of conservation concern, recognizing the importance of all habitats in contributing to the biological integrity, diversity, and environmental health of refuge lands and the watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize

that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987; Hunter 1991; Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the West River CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity, and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Freshwater Marsh)

Manage freshwater marshes to support natural and rare ecological communities, and provide potential breeding and foraging habitat for priority refuge resources of concern including American black duck, and maintain the natural water level variability in wetlands where the federally listed northeastern bulrush occurs.

Rationale:

Freshwater marshes are often dominated by emergent and submergent herbaceous vegetation. Scattered shrubs are often present, and trees are generally absent. Herbaceous vegetation typically includes common bulrush, jewelweed, marsh fern, water lily, and narrow-leaved cattail. This habitat is associated with lakes, ponds, impoundments, and slow-moving rivers and streams (Gawler 2008). These marshes are also maintained over time by beaver activity, an important natural disturbance process within the West River watershed.

Our coarse-scale habitat analysis of this CFA identifies these wetlands as scattered throughout the CFA with the largest freshwater marsh acreage occurring within a large wetland complex adjacent to the Townshend Reservoir. This particular wetland complex, adjacent to open water habitat, may provide important breeding and foraging habitat for American black duck, and other waterfowl species. Located within the Connecticut River watershed, an important migration corridor, this area may also be important as staging areas for migrating waterfowl. An evaluation of the wetlands in the CFA will be necessary to determine their potential as habitat for waterfowl species.

The northeastern bulrush, a wetland plant, occurs in isolated small wetlands in the CFA. This species is federally listed, and has adapted to seasonal water fluctuations. Habitat alterations that change the hydrology of a wetland to be consistently wet or dry may have negative consequences for this species. Biologists are currently monitoring known populations, but more information is needed on the habitat requirements, reproductive strategy, and genetic variability (USFWS 2006). Research, and preventing habitat destruction and deterioration of wetland sites where this plant is found are crucial steps to maintaining this northeastern bulrush populations.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of freshwater marshes at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Minimize refuge activities that disturb wetland communities.
- Encourage local landowners to use Vermont Best Management Practices within active agricultural fields that are located along the perimeter of marsh habitats.
- Explore and support research opportunities with academic partners to address information gaps for northeastern bulrush.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Inventory wetland plant communities, and evaluate wetland hydrology for potential impacts to the natural flow regimes.
- Survey wildlife use of existing wetlands.
- Map natural communities; protect rare or exemplary examples.
- Work with the State Natural Heritage Program to annually monitor the presence/absence of current northeastern bulrush populations in emergent wetlands.

Sub-objective 1.2b. (Pasture/Hay/Grassland)

Manage pasture, hay, and grasslands (where appropriate) as part of a mosaic of habitat conditions required by American woodcock and other shrub-dependent conservation concern species such as chestnut-sided warbler. Also maintain large contiguous tracts of grassland habitat, if present and appropriate.

Rationale:

More than two percent of the West River CFA is typed as pasture, hay, and grassland habitat. These habitat types require active manipulation to inhibit the natural succession of converting to forest. The pasture, hay, and grassland habitats tend to be dominated by grasses. Depending on habitat patch size, continuity of patches and timing of manipulations, this habitat type will support grassland dependent species such as bobolink and grasshopper sparrow. If these habitats are left unmaintained (e.g. not mowed), they will convert to a mixture of shrubs and grasses providing “old field” habitat for shrub dependent species such as chestnut-sided warbler, prairie warbler and field sparrow. American woodcock, a refuge priority resource of concern, will use both habitat conditions when managed in conjunction with their other habitat needs.

Many shrubland bird breeding populations occur in high proportions in the northeast, and therefore, are species of conservation responsibility (Dettmers, Randy 2003). For example, over 12% of the chestnut-sided warbler population breeds in BCR 14 (Dettmers, Randy 2006). While there is evidence that southern New England supported a small but significant grassland bird community before European settlement, only a small proportion of grassland breeding bird populations occurs in the northeast (Dettmers and Rosenberg 2000). Maintaining high quality shrubland habitat in this CFA will provide habitat for a higher percentage of species in decline. However, large and contiguous grasslands are rare in the watershed, and large grassland habitat patches are important to high priority grassland species and overall biological diversity. We will maintain large grassland patches (e.g. 500 acres), or areas where a high proportion of grassland cover is present in the landscape (e.g., a mosaic of many medium to large patches).

Shrubland and grassland habitats will also be used by American woodcock, which require diverse structural habitat conditions within close proximity of each other: clearings for courtship, forest openings with sparse shrub or herbaceous cover for roosting, young hardwood forests of shade intolerant tree species for nesting and brood rearing, and functional foraging areas (Sepik et al. 1994, Kelley et al. 2008). Small clearings with minimal vegetation is required for courtship areas, and shrublands with clumps of tall vegetation or sparse shrubs will provide roosting habitat.

Shrubland dominated habitats in the northeast support many species of conservation concern, many of which are a high conservation responsibility for the region, indicating the importance of shrubland habitats to these species in the CFA. Large, contiguous grassland habitats are also important to a suite of priority grassland bird species. Current pasture, hay, and grassland acres can provide quality habitat, for these species, and American woodcock, if managed appropriately. Baseline information on the condition of these habitats and association with other landscape features will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to protect and promote farming practices (e.g. haying and pasture of animals) that benefit wildlife and protect water quality.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct an inventory of these habitats to determine their condition, size and location, which will inform and prioritize appropriate management strategies in the HMP.

Sub-objective 1.2c. (Biological Integrity, Biological Diversity, and Environmental Health)

Where and when appropriate, protect, or restore habitats absent an identified species of conservation concern, recognizing the importance of all habitats in contributing to the biological integrity, diversity, and environmental health of refuge lands and the Watershed.

Rationale:

See rationale for objective 1.1d.

Habitats that occur within the West River CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.3: Inland Aquatic Habitats**Specific Sub-objectives to apply on refuge lands for aquatic habitats:****Sub-objective 1.3a. (Open Water)**

In collaboration with partners, manage water resources and riparian areas to provide cold temperature regimes, substrate diversity, and unimpeded aquatic species passage that benefit priority refuge resources of concern including Eastern brook trout, American shad, American eel, Atlantic salmon and brook floater, as well as other species of conservation concern such as sea lamprey. Maintain and protect the cobble shores of the West River, especially in areas that provide suitable habitat for the cobblestone tiger beetle.

Rationale:

The West River flows through the northern portion of the CFA, and along the eastern boundary as it enters and exits the Townshend Reservoir. The West River has been rated as having the highest abundance of high quality open water habitat as measured by a Vermont Index of Biotic Integrity, a measure of fish community health. It has a wide range of representative reaches extending from its headwaters to its mouth supporting diverse assemblages of fish species. The West River is also considered representative for assemblages of mussels and invertebrates in several locations, including Cobb Brook, which flows through the northern portion of the CFA.

The main stem and tributaries provide high quality cold water habitat for brook trout and Atlantic salmon. Brook trout and Atlantic salmon are sensitive to extreme temperature fluctuations, and require water temperatures between 40 to 70 degrees Fahrenheit for spawning, growth, and survival. The lower West River provides habitat for warm water species as well as diadromous fish such as American shad and American eel. Other species that occur in the West River CFA include yellow perch, creek chub, white sucker, pumpkinseed, carp, slimy sculpin, and blacknose dace. These species are hosts for the earliest life stages of resident mussels.

Another species of conservation concern that utilize freshwater aquatic habitats in this CFA is sea lamprey. Sea lamprey enter the Connecticut River and tributaries to reproduce, and in the process provide important ecological benefits to aquatic systems. Adults transport nutrients between freshwater and saltwater systems, their nest construction restores and enhances streambed structure, abandoned nests are used by other riverine fish, and lamprey eggs and larvae provide food for a variety of species (Kircheis 2004). As with many riverine fish, sea lamprey movement is impeded by barriers on the main stem and tributaries.

There is potential habitat for cobblestone tiger beetle, a species that has been petitioned for federal listing, within the West River CFA. This tiger beetle prefers sparsely vegetated sandy cobble beaches (Pyzikiewicz 2006). The West River provides these habitat conditions, and the cobblestone tiger beetle has been found in the watershed. This tiger beetle is also listed as state-endangered. Other species of concern that occur in the West River Watershed (not necessarily in the CFA) include the State-threatened brook floater mussel and eastern pearlshell, eleven state rare plant species, as well as historic records of the federally listed dwarf wedgemussel.

The Townshend Reservoir is located in the northern portion of the CFA. This man-made lake is associated with the Townshend Dam, which was built on the West River in 1961 by the U.S. Army Corps of Engineers to prevent flooding along the Connecticut River. This lake is managed by Vermont Fish and Wildlife Department and the Army Corps of Engineers, and supports rainbow, brown and brook trout, yellow perch, largemouth bass and bullhead.

Management of water resources in the West River CFA will focus on rivers and streams that provide uninterrupted aquatic species passage to spawning and wintering habitat and provide structurally diverse in-stream habitat. Due to our lack of knowledge regarding habitat conditions in the CFA, implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife and habitat inventory. Aquatic species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent forest conditions and land uses within the CFA and associated landscape. Baseline information on the condition of open water habitat will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 10 years of land acquisition and CCP approval:

- Implement a remediation plan for identified obstacles to aquatic species passage.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct stream assessments to evaluate the physical, chemical, and biological condition of the fish community structure, productivity, and health.
- Conduct stream assessments to identify man-made physical barriers (e.g., impassable road crossings, culverts, and dams) to the movement of fish and other aquatic organisms.
- Work with partners to monitor the West River for the cobblestone tiger beetle.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not Applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not Applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the West River Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education.

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the West River Division as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the West River Division as an outdoor classroom

Rationale:

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the West River Division as an outdoor classroom.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the West River Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA-compliant trail anticipated for the site, the West River Division would be well suited to

support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the West River Division's habitats and cultural resources.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Inventory and evaluate the CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the West River Division.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of acquiring sufficient land:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the West River Division.
- Incorporate thematic statements, measureable objectives and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures, i.e., general brochure and bird checklist that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the West River Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the West River Division would be unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access, and Infrastructure)

Provide the opportunity for a quality hunting experience following state regulations, except as noted under Strategies below.

Rationale:

The West River CFA is a popular area to hunt white-tailed deer, Eastern wild turkey, black bear, and small game. Hunting will be allowed on a newly created division, consistent with the final compatibility determination. Retaining hunting opportunities on public lands will ensure this wildlife-dependent recreational activity continues and contribute to the state's population management objectives.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Complete all administrative requirements to officially open to hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Allow hunters access to the refuge outside of the normal division open hours (i.e., 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.

- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with Vermont Fish and Wildlife Department to determine whether opportunities exist for state-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with Vermont Fish and Wildlife Department to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge Web site, at West River Division kiosks, through a friends group, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with Vermont Fish and Wildlife Department to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.
- Offer to host hunter education field courses.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access, and Infrastructure)

Provide quality fishing opportunities at the West River Division after completing all administrative procedures to officially open refuge lands to fishing, based on Vermont Fish and Wildlife Department regulations, and any division-specific conditions.

Rationale:

There are several streams in the proposed CFA including the West River, Cobb Brook, Turkey Mountain Brook, Little Turkey Mountain Brook, Fair Brook, Negro Brook, Wardsboro Brook, Smith Brook, and Ranney Brook. A variety of game fish are found in these streams and fishing opportunities exist for several trout species. Fishing is a popular activity and would continue under Service ownership. Retaining fishing opportunities conforms to historic use within the CFA and much of the surrounding land in the area.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Complete all administrative requirements to officially open to fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk to post information on fishing seasons and other notices to visitors.
- The West River Division would be open daily to all visitors, including anglers, from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters.

Within 5 years of acquiring land with fishable waters:

- Work with the Vermont Fish and Wildlife Department to inventory and assess fish populations on the division.
- Work with the Vermont Fish and Wildlife Department to evaluate potential fishing enhancements, as appropriate.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Fishing is a priority public use and a traditional use in the CFA. If land is acquired, the refuge will make information readily available to interested anglers regarding opportunities to fish on Service-owned land, location of fishable waters, and the available game fish.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available at the refuge website, refuge offices, division kiosks, through friends groups, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography for people of all physical abilities.

Rationale:

Wildlife viewing and photography are priority public uses on national wildlife refuges and a popular recreational activity. Local organizations such as Vermont Audubon chapters and others offer organized field trips to popular natural areas. A new division in this area would offer people the chance to see and photograph wildlife and in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land:

- Allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters and anglers.
- Install an informational kiosk in a conspicuous location to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 5 years of acquiring sufficient land:

- Develop a public access strategy and required planning (e.g., NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring sufficient land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with a friends group and other partners that host events designed to view wildlife on the division.

Rationale:

The entire division would be available for wildlife observation and photography; however, there are steps the refuge can take to enhance the experience. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of acquiring sufficient land:

- Develop interpretive panels for kiosks and trails that describe typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.

- Encourage local schools and groups such as a local chapter of Vermont Audubon and other environmental organizations to offer wildlife-centered trips to the refuge.
- Produce a list of wildlife species and associated habitats and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.

Within 10 years of acquiring sufficient land:

- Develop a public access strategy and required NEPA documentation that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the West River Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional water-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as fishing, boating, and wildlife observation. Where appropriate, we will work with these partners to promote and distribute information about these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any water trails (e.g., canoe/kayak trails) that are part of a regional or State network for their compatibility.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the West River Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as wildlife observation and photography. Examples include regional hiking trails and regional snowmobile trails part of the Vermont Association of Snow Travelers (VAST) system. When determined appropriate and compatible, we will work with these partners to promote and distribute information about these opportunities.

Within 1 year of acquiring sufficient land:

- On newly acquired land that contains an existing snowmobile trail that is part of the VAST system, determine if maintaining the trail on the refuge is appropriate and compatible. If found appropriate and compatible, work with VAST and the responsible local snowmobile club to manage snowmobile use under a special use permit.

Within 5 years of acquiring land:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Develop compatible opportunities on the West River Division that support initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land:

- Allow dispersed hiking, snowshoeing, and cross-country skiing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Work with users to delineate winter cross-country skiing trails and determine whether a special use permit to manage winter trails is warranted.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.

Within 5 years of acquiring sufficient land:

- Work with Friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge divisions and units.

Overview White River Conservation Focus Area (Proposed)

Stockbridge and Killington, Vermont

| Conservation Focus Area (CFA)—Acreage Profile | Acres | Percentage of CFA |
|--|--------|-------------------|
| Total CFA Acres to be Conserved by Service | 10,031 | 88.8% |
| ■ Existing Refuge Ownership in CFA ¹ | 0 | |
| ■ Additional Acres in CFA proposed for Refuge Acquisition ² | 10,031 | |
| Existing Acres in CFA Permanently Conserved by Others ^{2,3} | 1,267 | 11.2 % |
| Total Acres in CFA ^{2,4} | 11,298 | 100 % |

¹Acres from Service's Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

The White River is one of the best examples of its river type in Vermont for fish and macroinvertebrates (Langdon et al. 1998) and was identified by the State of Vermont as a high priority river corridor that provides habitat for many of the State species of greatest conservation concern (VFWD personal communication 2011). The White River, including several of its major tributaries, was an SFA in the 1995 Conte FEIS. The proposed White River CFA is located within a large network of conserved lands, including the Green Mountain National Forest, Gifford Woods State Park, the White River Stream Bank and Les Newell Wildlife Management Areas, and extensive Vermont Land Trust conserved areas. Additional land protection by the Service in this area will help better connect these conserved lands. The area is also expected to be relatively resilient to climate change impacts in the future. The Appalachian Trail Corridor, which crosses the proposed CFA, provides outstanding recreational opportunities.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Hardwood Forest – 90%

See map A.67 and table A.49 for more detailed habitat information for the CFA.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.50 below, there are nine refuge Priority Refuge Resources of Concern (PRRC) terrestrial and aquatic species that may rely upon the diverse habitats in this CFA. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. The refuge will seek to protect and restore (if necessary) these habitat types. Additionally, we recognize the value of this area to species that require large contiguous forest tracts including American black bear, bobcat and forest interior dwelling bird species. These species and others are discussed further below.

1. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA), and habitats along the main stem, receives higher use by migrating landbirds. As birds move north, they disperse beyond the Connecticut River main stem, becoming more evenly distributed in habitats across the watershed (Smith College 2006). The White River CFA not only provides important stopover habitat for migrating landbirds, but breeding habitat as well.

The PRRC species for the White River CFA include wood thrush and chestnut-sided warbler. This CFA is located in their core breeding range, and the contiguous forests provide breeding habitat for these and other forest nesting birds, many of which are priority conservation concern species. Over 91% of the CFA is contiguous forest, interspersed with riparian, cliff and talus, and rocky outcrop communities. Peregrine falcon is another PRRC species, as well as a State Species of Greatest Conservation Need (SGCN). The cliff and talus systems in the CFA are used by nesting peregrine falcons, where the elevations can rise above 2,600 feet.

2. Diadromous fish and other aquatic species

The PRRC species for the White River CFA include brook trout and Atlantic salmon. The White River is the longest free-flowing tributary to the Connecticut River, and flows through the White River CFA. The many brooks that flow into the White River, such as Fletcher Brook, Stony Brook, Taggart Brook, Broughton Brook and Boutwell Brook, provide high quality cold water habitat for these species. Within Vermont, the White River has been identified as a high-quality river that supports healthy, native populations of macroinvertebrates and fish (Langdon et al. 1998). Brook trout and salmon are also high conservation concern for the State and the Service's Northeast Region.

3. Other

The White River CFA southern boundary is within 2 miles of the abandoned Bridgewater Mines, which were used by over a hundred hibernating little brown, tricolored, big brown and northern long-eared bat species. These mines are no longer being used by bats due to decimation by white-nose syndrome. The northern long-eared bat was recently listed as federally threatened. Little brown, tricolored and eastern small-footed bats are undergoing review for listing under the ESA, and are a PRRC. Little brown bat and tricolored bat are currently being assessed for candidate status and eastern small-footed bat have been petitioned for listing under the ESA. The habitats within the CFA may still provide current or future roosting, feeding and potential maternity sites.

The rocky outcrops and forested habitats within the CFA provide denning sites for American black bear and bobcat, as well as a contiguous landscape for these wide ranging mammals to breed and disperse.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

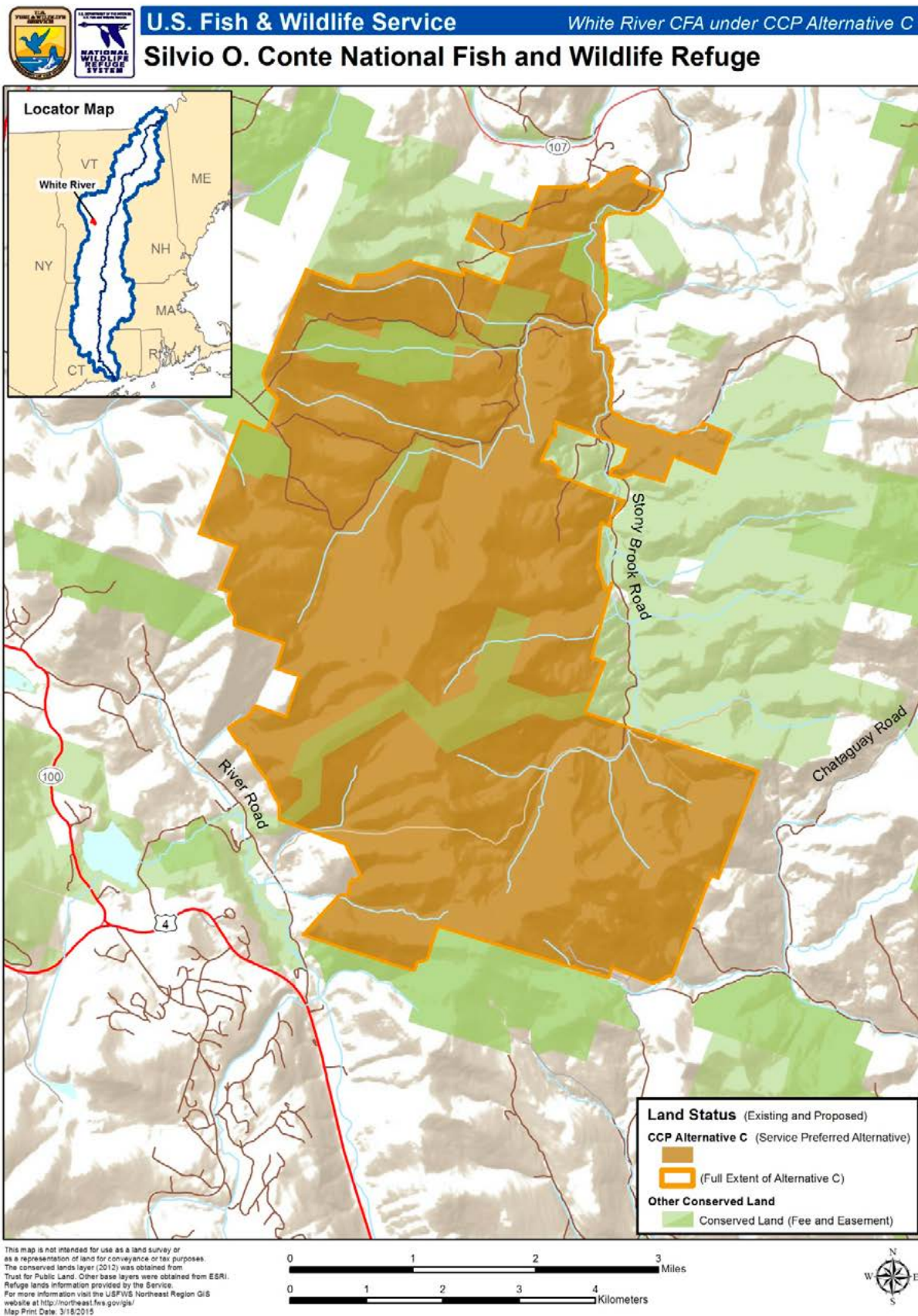
We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (ie. forested, non-forested and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down Habitat Management Plan. Once inventory has been completed, then management will focus on maintaining the following conditions:

- Forest management activities will provide a diversity of seral stages including early successional and mature forested habitats. The forests in the CFA will be structurally diverse and appropriate for site conditions and location. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Open water (stream, rivers) will focus on maintaining forested stream buffers, a structurally diverse instream habitat, and clear aquatic species passage to spawning and wintering habitat.

What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

The National Wildlife Refuge System Improvement Act of 1997 identified hunting, fishing, wildlife observation, photography, interpretation, and environmental education as priority, wildlife-dependent uses. As such, these uses would receive priority on refuge lands.

Map A.66. White River CFA – Location.



Map A.67. White River CPA/CFA – Habitat Types.

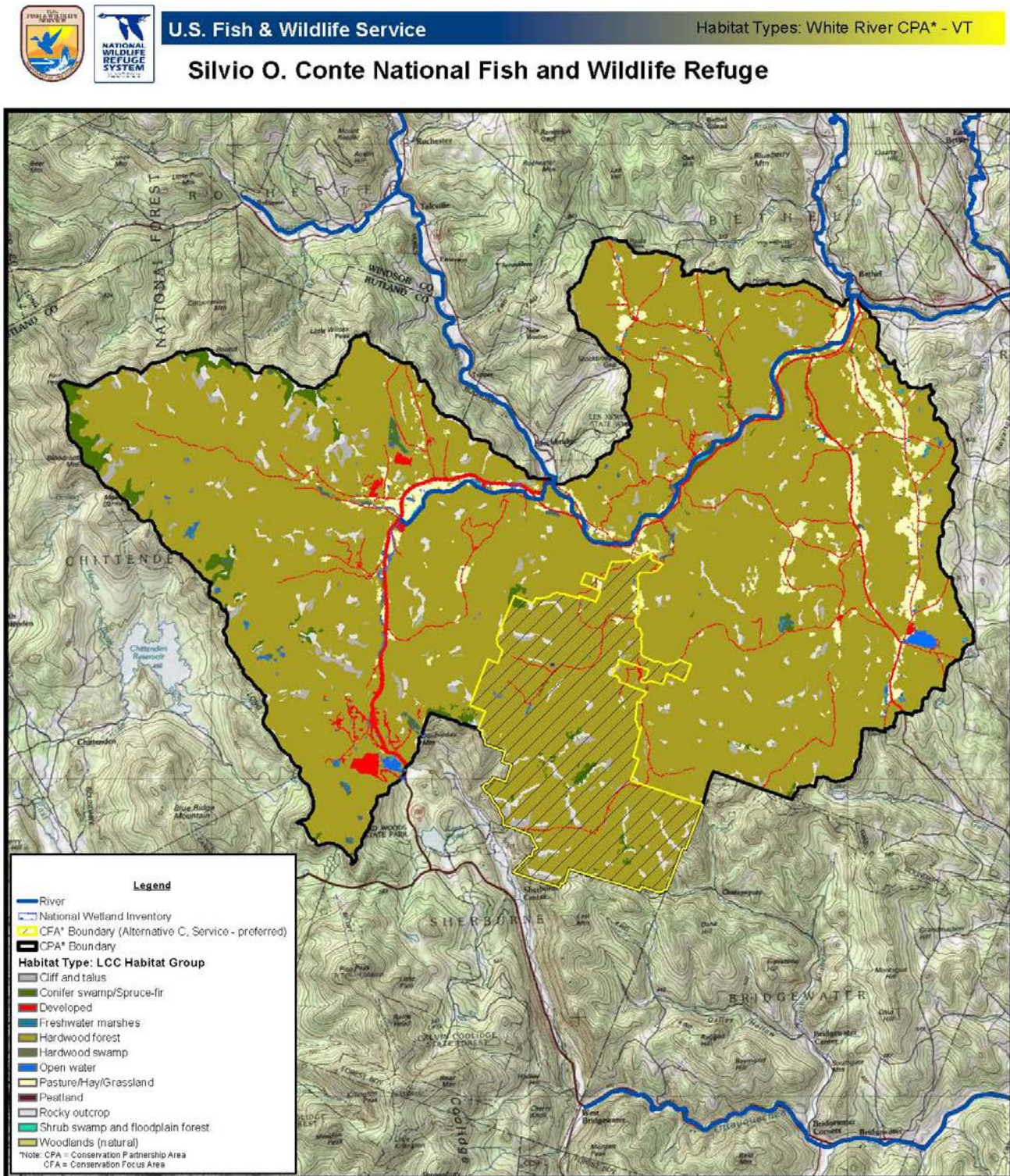


Table A.49. White River CPA/CFA – Habitat Types.

| LCC General Habitat Type ¹ | CPA ² | | CFA ³ | | | | Percent Habitat ⁸ |
|--|------------------|-----------------------------|------------------|----------------------------------|--------------------------|--------------------------|------------------------------|
| | Total Acres | Percent of CPA ⁴ | Total Acres | Conserved by Others ⁵ | USFWS Owned ⁶ | Percent CFA ⁷ | |
| Forested Uplands and Wetlands ⁹ | | | | | | | |
| Conifer swamp/spruce-fir | 1,787 | 2.1% | 184 | 63 | 0 | 1.6% | 10.3% |
| Hardwood forest | 71,568 | 85.7% | 10,160 | 1,087 | 0 | 90.0% | 14.2% |
| Hardwood swamp | 53 | 0.1% | 0 | 0 | 0 | 0.0% | 0.0% |
| Shrub swamp and floodplain forest | 80 | 0.1% | 1 | 0 | 0 | 0.0% | 0.8% |
| Woodlands (natural) | 52 | 0.1% | 1 | 1 | 0 | 0.0% | 1.3% |
| Forested uplands and wetlands subtotal | 73,540 | 88.1% | 10,345 | 1,151 | 0 | 91.6% | 14.1% |
| Non-forested Uplands and Wetlands ⁹ | | | | | | | |
| Cliff and talus | 1,307 | 1.6% | 228 | 13 | 0 | 2.0% | 17.4% |
| Freshwater marshes | 104 | 0.1% | 2 | 0 | 0 | 0.0% | 1.5% |
| Pasture/hay/grassland | 3,314 | 4.0% | 64 | 8 | 0 | 0.6% | 1.9% |
| Peatland | 4 | 0.0% | 3 | 0 | 0 | 0.0% | 65.0% |
| Rocky outcrop | 2,141 | 2.6% | 497 | 82 | 0 | 4.4% | 23.2% |
| Non-forested uplands and wetlands subtotal | 6,871 | 8.2% | 793 | 103 | 0 | 7.0% | 11.5% |
| Inland aquatic habitats ⁹ | | | | | | | |
| Open Water | 288 | 0.3% | 0 | 0 | 0 | 0.0% | 0.0% |
| Inland aquatic habitats subtotal | 288 | 0.3% | 0 | 0 | 0 | 0.0% | 0.0% |
| Other | | | | | | | |
| Developed | 2,791 | 3.3% | 155 | 16 | 0 | 1.4% | 5.5% |
| Other subtotal | 2,791 | 3.3% | 155 | 16 | 0 | 1.4% | 5.5% |
| TOTAL | 83,490 | 100.0% | 11,293 | 1,270 | 0 | 100.0% | 13.5% |

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.32 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Partnership Area

3 - Conservation Focus Area; representing Service - preferred Alternative C

4 - Percentage of the CPA represented by the habitat type

5- Acres in the CFA currently conserved by others (TNC 2012)

6 - Acres in the CFA currently owned by the USFWS

7 - Percentage of the CFA represented by the habitat type

8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C

9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.50. White River CFA – Preliminary Priority Resources of Concern.

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|---|--|---|
| Forested Uplands and Wetlands⁴ | | |
| Hardwood Forest⁵ - 10,334 acres | | |
| Wood Thrush^{A, B, C} | Breeding habitat includes contiguous mature forests (80+ years old) dominated by deciduous tree species, moist soils, a moderate to dense sub-canopy and shrub density, open forest floor and closed canopy (Roth et al. 1996, Rosenberg et al. 2003). | Baltimore Oriole ^J Black-and-white Warbler ^J Black-billed Cuckoo ^{A, I, J} Broad-winged hawk ^J Rose-breasted Grosbeak ^A Northern Flicker ^{A, J} |
| Chestnut-sided Warbler^{A, B} | Early successional deciduous forested upland and wetland habitat (Dunn et al, 1997, Richardson et al, 1995) | Scarlet Tanager ^J Ruffed Grouse ^{A, I} Whip-poor-will ^{A, I, J} |
| Little Brown Bat ^{B, E} Tri-colored Bat ^E Northern Long-eared Bat ^E Eastern Small-footed Bat ^E | Caves used for hibernation. Roosting trees located in forested landscapes clustered in stands of large trees with cavities or loose bark. Cliffs, ledges, talus slopes also important for roosting/nesting. Maternity trees (8"-14" dbh) and travel corridors to water are also important (Degraaf et al, 2001, Darling Guidelines, unpublished). | Louisiana Waterthrush Brown Thrasher ^I Blackburnian Warbler ^A Ovenbird^A Eastern Red Bat^I American Redstart ^{A, J} Eastern Wood-pewee ^{A, J} Red-shouldered Hawk ^{I, J} Black-throated Green Warbler ^A Black-throated Blue Warbler ^{A, I} Yellow-bellied Sapsucker ^{A, J} Bobcat ^I Long-tailed Weasel ^I Woodland Vole ^I Black Bear ^I Veery ^{A, I} |
| Conifer Swamp⁵ - 10 acres | | |
| Laurentian-Acadian conifer-hardwood acidic swamp ^H | The <i>conifer-hardwood acidic swamps</i> occur on mineral soils that are nutrient-poor; there may be an organic top soil horizon, but the substrate is generally not deep peat. These basin wetlands remain saturated for all or nearly all of the growing season, and may have standing water seasonally. There may be some seepage influence, especially near the periphery. Red maple, ash, red spruce (rarely Black spruce), and balsam fir are the most typical trees. The herbaceous and shrub layers tend to be fairly species-poor, and include catberry and ferns of the genus <i>Osmunda</i> (Gawler 2008). | uncommon plant community within the landscape that contributes to BIDEH* |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|---|---|--|
| Forested Uplands and Wetlands⁴ | | |
| Shrub Swamp and Floodplain Forest⁵ - 1 acre | | |
| Laurentian-Acadian wet meadow-shrub swamp ^H | <i>Wet meadow-shrub-swamps</i> are often associated with lakes and ponds, but are also found along streams, where the water level does not fluctuate greatly. They are commonly flooded for part of the growing season but often do not have standing water throughout the season. The size of occurrences ranges from small pockets to extensive acreages. The system can have a patchwork of shrub and grass dominance; typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush. Trees are generally absent and, if present, are scattered (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |
| Woodlands (natural)⁵ - 1 acre | | |
| Central Appalachian pine-oak rocky woodland ^H | This system of the central Appalachians encompasses open or sparsely wooded hilltops and outcrops or rocky slopes. The substrate rock is granitic or of other acidic lithology. The vegetation is patchy, with woodland as well as open portions. Pine species are indicative and often are mixed with Oak species. Some areas have a fairly well-developed heath shrub layer; others a grass layer. Conditions are dry and nutrient-poor, and many, if not most, sites have a history of fire (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |
| Non-Forested Uplands and Wetlands⁴ | | |
| Cliff and Talus⁵ - 228 acres | | |
| Peregrine Falcon ^{C, G} | Nests on cliffs, ledges, and talus slopes near open habitats including rivers, lakes, and marshes, and lack of human disturbance (DeGraaf et al. 2001). | Uncommon plant community within the landscape that contributes to BIDEH* |
| Freshwater Marshes⁵ - 2 acres | | |
| Laurentian-Acadian freshwater marsh ^H | These freshwater emergent and/or submergent marshes are dominated by herbaceous vegetation. They occur in closed or open basins that are generally flat and shallow. They are associated with lakes, ponds, slow-moving streams, and/or impoundments or ditches. The herbaceous vegetation does not persist through the winter. Scattered shrubs are often present and usually total less than 25% cover. Trees are generally absent and, if present, are scattered. The substrate is typically muck over mineral soil. Vegetation includes common bulrush, narrow-leaf cattail, marsh fern, common jewelweed and sedges (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|---|--|--|
| Non-Forested Uplands and Wetlands⁴ | | |
| Pasture/Hay/Grassland⁵ – 64 acres | | |
| Where appropriate and supported by the local community, restore to forest habitat types | See species composition and structure above. | See species associated with forested habitat types above. |
| Peatland⁵ – 3 acres | | |
| Boreal-Laurentian-Acadian acidic basin fen ^H | These fens have developed in open or closed relatively shallow basins with nutrient-poor and acidic conditions. The substrate is sphagnum, and vegetation typically includes areas of dominance by grasses and dwarf-shrubs. Leatherleaf is usually present, and scattered stunted trees may occur. These fens often develop adjacent to open water (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |
| Non-Forested Uplands and Wetlands⁴ | | |
| Rocky Outcrop⁵ – 497 acres | | |
| Northern Appalachian-Acadian rocky heath outcrop ^H | The <i>Northern Appalachian-Acadian rocky heath outcrop</i> system occurs on ridges or summits of erosion-resistant acidic bedrock. The vegetation is patchy, often a mosaic of woodlands and open glades. red oak and various conifers, including white pine and red spruce, are characteristic trees. Low heath shrubs, including sheep laurel, low-bush blueberry, black huckleberry, and black chokeberry are typically present. Exposure and occasional fire are the major factors in keeping the vegetation relatively open (Gawler 2008). | Uncommon plant community within the landscape that contributes to BIDEH* |

| Priority Refuge Resources of Concern ¹ | Habitat Structure ² | Associated Species ³ |
|--|--|---|
| Inland Aquatic Habitats⁴ | | |
| Water⁵ (GIS data did not capture acreage due to dense forest cover along small stream and river corridors) | | |
| Brook Trout^F | Spawning habitat includes clear, well oxygenated cold water lakes/ponds/streams with silt-free rocky substrate, abundant cover, vegetated banks, stable temperatures and stream flow (VTWAP 2005). | Blacknose Shiner ^I Riffle Snaketail ^H Brook Snaketail ^H Zebra Clubtail ^H |
| Atlantic Salmon^{E, G} | Spawn in cold freshwater moving streams w/ coarse clean gravel and adequate food/cover. Migrate in large rivers (VTWAP 2005). | |

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

A: 2008 Bird Conservation Region 14.

B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.

C: 2008 USFWS Birds of Conservation Concern.

D: Federal Threatened and Endangered status as of 2010, including Candidate Species

E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010

F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan

G: Silvio O Conte Refuge Purpose Species.

H: 2008 North East Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

A: 2008 Bird Conservation Region 14.

I: 2005 Vermont Wildlife Action Plan (Species of Greatest Conservation Need)

J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Goals, Objectives, and Strategies for Refuge Lands in the White River CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forest)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure, and improve landscape connectivity of hardwood forest habitat to support species of conservation concern and aid in climate change adaptation. Management will provide breeding and foraging habitat for priority refuge resources of concern, including wood thrush, chestnut-sided warbler, and cave dwelling bats.

Rationale:

We envision healthy forests within the White River CFA where a diverse seral structure provides suitable breeding and post-breeding habitat conditions for a suite of Vermont's wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010, Fraver et al. 2011).

The Upper White River watershed has been identified by Audubon Vermont as important breeding habitat for a number of responsibility birds that have a high proportion of their global population breeding in the region. To date, our review of White River's habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, and an understanding of forest disturbance and land-use history in New England. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within White River comes exclusively from a reading of forest history in New England—a legacy of intensive past-use that altered the vegetation structure and composition, landscape patterns, and ongoing ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, Bellemare et al. 2002, Hall et al. 2002). Our sub-objective assumes the forests of White River are more homogeneous than those of three centuries earlier, and they include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Goodburn and Lorimer 1998, Foster et al. 1998, Foster 2000, Bellemare et al. 2002, Cogbill et al. 2002, Abrams 2003). Completing a comprehensive forest and habitat inventory post-acquisition will test these assumptions, and aid in identifying stands where a forest management approach that combines passive management and with the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and move succession forward to emulate later seral stage characteristics.

For forest birds, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. While our management goals may create a relatively old forest, hardwood forests within White River will contain a variety of patches in different age classes and developmental stages; it is not uniform throughout. This diversity of age classes provides a variety of bird species with a range of nesting and foraging opportunities. Further, finer-scale investigation of forest conditions may identify opportunities to improve age class diversity through the creation of early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like North Atlantic LCC (NALCC) representative species the chestnut-sided warbler and others, are declining as remaining patches of young forest mature (Sepik et al. 1994, Kelley et al. 2008). Across the CFA, enhanced horizontal

structure will provide foraging opportunities for bats, and support other species of conservation concern like ruffed grouse, black-throated blue warbler, American redstart, and black bear.

In a mature forest, many nesting bird species tend to remain within specific vegetation layers: on or near the ground, in the middle layer, or up in the canopy. White River's hardwood forests should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of nesting and foraging opportunities. These habitat elements may have importance to declining mature forest-interior species identified in regional conservation plans like wood thrush. Wood thrush nest and feed at the ground level; a sub-canopy layer of shrubs, moist soils, and leaf litter are important habitat features (Roth et al. 1996, Rosenberg et al. 2003). And wood thrush has significance as a NALCC representative species for hardwood forests in the NALCC southern sub-region.

Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater than 75 to 80 percent closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like wood thrush. The distribution and concentration of these openings will vary, but interior forest conditions will be maintained on the whole. Close canopy conditions favor a suite of interior-nesting bird species that include: ovenbird, black-throated blue warbler, black-throated green warbler, and —when along rocky bottomed streams— Louisiana waterthrush.

Efforts to maintain or improve seral stage diversity within the CFA will include the retention of large-diameter (24 inches or greater in dbh) trees where appropriate. Such larger trees are either absent or are very few in younger forests, and that has implications for the habitat of wildlife species and for nutrient cycling. The White River CFA southern boundary is within 2 miles of the Bridgewater Mines, which were used by over a hundred hibernating little brown, tricolored, big brown and northern long-eared bat species (see sub-objective 1.2b for further discussion). These mines are no longer being used by bats due to decimation by white-nose syndrome. Little brown, northern long-eared, tricolored and eastern small-footed bats are undergoing review for listing under the ESA. Little brown bat and tricolored bat are currently being assessed for candidate status, while northern long-eared and eastern small-footed bat have been petitioned for listing under the ESA. Upon emergence from the hibernacula, females will travel to their summer range to give birth to pups in maternity colonies, while male bats often remain within 5 miles of the hibernaculum throughout the summer (Darling, unpublished). Crevices behind peeling bark of large diameter trees or cavities in partially decayed trees are used for maternity colonies and summer day roosts (Caceres and Pybus 1997). The habitats within the CFA may still provide current or future roosting, feeding and potential maternity sites. Structurally-sound, large-diameter trees are also important nest sites for woodland raptors, such as the red-shouldered hawk. Snags and cavity trees also provide important nesting and foraging sites for bird species such as nuthatches, owls, and woodpeckers, like the yellow-bellied sapsucker.

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Identify sites appropriate for early successional management.
- Collaborate with partners within the Upper White River Cooperative Weed Management Association to strategically prevent and manage invasive plants.

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Within 10 years of land acquisition and CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Retain and recruit 3 to 6 large (16 inch DBH) live or dead trees such as silver maple, beech, green ash, yellow birch and sugar maple per acre within a 5-mile radius of bat hibernacula as bat roosting sites.
- Create small canopy openings to improve solar exposure of existing or potential roost trees.
- Maintain contiguous late successional forest cover within 2 to 3 miles of rock cliffs and ledges to protect potential roosting sites of eastern small-footed bats.
- Protect hard and soft mast producing species such as American beech inclusions, and apple and cherry trees, through the use of best management practices.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.
- Survey for and protect active maternity colonies and summer roost sites.

Sub-objective 1.1b. (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the White River CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Collaborate with partners within the Upper White River Cooperative Weed Management Association to strategically prevent and manage invasive plants.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Cliff and Talus)

Protect cliffs, ledges and talus slopes to maintain the biological integrity, health and diversity of associated natural and rare ecological communities. Emphasis will be on sites occupied by nesting peregrine falcons and roosting bats.

Rationale:

Cliff and talus systems within this CFA occur below treeline at low to mid elevations. The vegetation is patchy and often sparse, punctuated with patches of small trees that may form woodlands in places (Gawler 2008). The type of rock, microclimate, and soil availability from higher elevation sources directly and indirectly influence vegetation within these systems (Thompson and Sorenson 2000). Rock types may include limestone, dolomite, granite, schist, slate, or shale which breakdown differently in the environment providing varying levels of nutrients, moisture, ground stabilization, and soil availability. Sun exposure, aspect, elevation, and moisture provide different microclimate conditions impacting vegetation type and growth. These systems provide unique niches for rare and uncommon plants, and habitat for snakes, including the rare eastern timber rattlesnake, black rat snake, and eastern garter snake. Exposed cliffs provide nesting habitat for turkey vultures, ravens, porcupines, and peregrine falcons, a state species of greatest conservation need. Peregrine falcons are also a refuge purpose species. Vermont's breeding population has increased steadily since they were extirpated from the Eastern US in the mid to late 1960's due to indiscriminate use of DDT following World War II. Peregrines are nesting in White River CFA, and monitoring and management of Vermont's Peregrine population is being coordinated by Audubon Vermont.

Bats will use caves or mines within the cliff and talus systems for "hibernacula," where they hibernate, and rock crevices for summer roosting sites. This region hosted two bat hibernacula—two unused mines in Bridgewater. The Bridgewater mines were surveyed in the winter by the state between 2009 and 2013. Over a hundred bats were hibernating in each mine, including little brown bats, northern long-eared bats, tricolored bats, and big brown bats. These mines are no longer being used by bats due to decimation by white-nose syndrome. Although this hibernaculum is about a mile from the CFA boundary, and no longer used by bats at this time, the habitats within the CFA are still significant for roosting, feeding and for potential maternity sites (see sub-objective 1.1a for further discussion).

Management of cliff and talus systems in the White River CFA will begin with a comprehensive, multi-scale wildlife and habitat inventory. Wildlife species survival and breeding success is dependent on habitat at a fine scale and the surrounding landscape, making it necessary to look at the adjacent forest conditions and land uses within the CFA and associated landscape. Baseline information on the condition of cliff and talus systems at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down Habitat Management Plan.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Evaluate and manage human (e.g. recreational) influences, and conduct outreach and education as necessary.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Identify historical, active, and potential peregrine falcon nesting sites.
- Coordinate with conservation organizations to conduct spring surveys of identified sites to determine occupancy.

- Work with partners to annually monitor active sites to determine occupancy status and reproductive outcome.
- Survey for and protect bat roosting sites.

Sub-objective 1.2b. (Pasture/Hay/Grassland)

Manage pasture, hay, and grasslands (where appropriate) for shrub-dependent conservation concern species such as chestnut-sided warbler.

Rationale:

Less than one percent of the White River CFA is typed as pasture, hay, and grassland habitat. These habitat types require active manipulation to inhibit the natural succession of converting to forest. The pasture, hay, and grassland habitats tend to be dominated by grasses. Depending on habitat patch size, continuity of patches and timing of manipulations, this habitat type will support grassland dependent species such as bobolink and grasshopper sparrow. If these habitats are left unmaintained (e.g. not mowed), they will convert to a mixture of shrubs and grasses providing “old field” habitat for shrub dependent species such as chestnut-sided warbler, prairie warbler and field sparrow.

Many shrubland bird breeding populations occur in high proportions in the northeast, and therefore, are species of conservation responsibility (Dettmers, Randy 2003). For example, over 12% of the chestnut-sided warbler population breeds in BCR 14 (Dettmers, Randy 2006). While there is evidence that southern New England supported a small but significant grassland bird community before European settlement, only a small proportion of grassland breeding bird populations occurs in the northeast (Dettmers and Rosenberg 2000). Maintaining high quality shrubland habitat in this CFA will provide habitat for a higher percentage of species in decline.

Shrubland dominated habitats in the northeast support many species of conservation concern, many of which are a high conservation responsibility for the region, indicating the importance of shrubland habitats to these species in the CFA. Current pasture, hay, and grassland acres can provide quality habitat for these species, if managed appropriately. In order to make an informed management decision, it will be necessary to conduct a comprehensive, multi-scale wildlife and habitat inventory. Baseline information on the condition of these habitats will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Collaborate with partners within the Upper White River Cooperative Weed Management Association to strategically prevent and manage invasive plants.
- Work with partners to protect and promote farming practices (e.g. haying and pasture of animals) that benefit wildlife and protect water quality.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- As new pasture, hay, and/or grassland habitat is acquired, evaluate its ecological importance to determine if it should be maintained, managed as shrubland or restored to native forest through tree plantings or natural succession.

Sub-objective 1.2c. (Biological Integrity, Biological Diversity, and Environmental Health)

Where and when appropriate, protect, or restore habitats absent an identified species of conservation concern, recognizing the importance of all habitats in contributing to the biological integrity, diversity, and environmental health of refuge lands and the Watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges’ “biological integrity, diversity, and environmental health” (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy

suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the White River CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity, and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Collaborate with partners within the Upper White River Cooperative Weed Management Association to strategically prevent and manage invasive plants.

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, manage water resources and riparian areas to provide cold temperature regimes, substrate diversity, and clear aquatic species passage that benefit priority refuge resources of concern including Eastern brook trout and Atlantic salmon.

Rationale:

The White River is the longest free-flowing tributary to the Connecticut River, and is very important to Atlantic salmon restoration. The many brooks that flow into the White River, such as Fletcher Brook, Stony Brook, Taggart Brook, Broughton Brook, and Boutwell Brook, provide high quality cold water habitat for brook trout and Atlantic salmon. Brook trout and Atlantic salmon are sensitive to extreme temperature fluctuations, and require water temperatures between 40-70 degrees Fahrenheit for spawning, growth, and survival. Brook trout and salmon are a high priority for conservation by the State and the Service's Northeast Region. Other species that occur in the White River CFA include creek chub, white sucker, slimy sculpin, and blacknose dace.

Management of water resources in the White River CFA will focus on providing rivers and streams that provide clear aquatic species passage to spawning and wintering habitat and structurally diverse in-stream habitat. Due to our lack of knowledge regarding habitat conditions in the CFA, implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife and habitat inventory. Aquatic species survival and breeding success is dependent on not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent forest conditions and land uses within the CFA and associated landscape. Baseline information on the condition of open water habitat will further inform more detailed habitat prescriptions within a required step-down Habitat Management Plan.

Management Strategies:

Within 10 years of land acquisition and CCP approval:

- Work with partners to implement a remediation plan for identified obstacles to aquatic species passage.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to conduct stream assessments to evaluate the physical, chemical, and biological condition of the fish community structure, productivity, and health.
- Work with partners to conduct stream assessments to identify man-made physical barriers (e.g. impassable road crossings, culverts, and dams) to the movement of fish and other aquatic organisms.
- Collaborate with partners within the Upper White River Cooperative Weed Management Association to strategically prevent and manage invasive plants.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the White River Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the White River Division as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the White River Division as an outdoor classroom.

Rationale:

See rationale for sub-objective 2.1a.

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the White River Division as an outdoor classroom.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the White River Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA compliant trail planned for the site, the White River Division will be well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the White River Division's habitats and cultural resources.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the White River Division.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of acquiring sufficient land:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, and printed media.
- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the White River Division.
- Incorporate thematic statements, measureable objectives, and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures, e.g., general brochure and bird checklist that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the White River Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the White River Division would be unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and which provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access and Infrastructure)

Provide the opportunity for a quality hunting experience following state regulations, except as noted under Strategies below.

Rationale:

The White River CFA is a popular area to hunt white-tailed deer, Eastern wild turkey, black bear, and small game. Hunting would be allowed on a newly created division as long as it is found to be a compatible use. Hunting, if found to be a compatible use, will be allowed when the Service acquires land that can support hunt seasons. Retaining hunting opportunities on public lands will ensure this wildlife-dependent recreational activity continues and contribute to the state's population management objectives.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Complete all administrative requirements to officially open to hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Allow hunters access to the refuge outside of the normal division open hours (i.e. 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.

- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with Vermont Fish and Wildlife Department to determine whether opportunities exist for State-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with Vermont Fish and Wildlife Department to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge Web site, at White River Division kiosks, through a friends group, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with Vermont Fish and Wildlife Department to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.
- Offer to host hunter education field courses.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access and Infrastructure)

Provide quality fishing opportunities at the White River Division after completing all administrative procedures to officially open refuge lands to fishing, based on Vermont Fish and Wildlife Department regulations, and any division-specific conditions.

Rationale:

There are many fishable streams in the proposed CFA including the White River, Boutwell Brook, Broughton Brook, Dalton Brook, Little Stony Brook, Davis Hill Brook, Perkins Brook, Johnson Brook, Taggart Brook, Fletcher Brook, Windfall Brook, Basin Brook, Mink Brook, Quimby Brook, and Taylor Brook. The White River from Stockbridge to Bethel represents exceptional fishing opportunities for rainbow trout, brown trout, smallmouth bass, and walleye. Johnson and Fletcher Brooks possess quality fishing opportunities for wild rainbow and brook trout. A variety of game fish are found in the other streams of the CFA. Fishing is a popular activity throughout this area and would continue under Service ownership. Retaining fishing opportunities conforms to historic use on CFA and much of the surrounding land in the area.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Complete all administrative requirements to officially open to fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk to post information on fishing seasons and other notices to visitors.
- The White River Division would be open daily to all visitors, including anglers, from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters.

Within 5 years of acquiring land with fishable waters:

- Work with the Vermont Fish and Wildlife Department to inventory and assess fish populations on the division.
- Work with the Vermont Fish and Wildlife Department to evaluate potential fishing enhancements, especially to the White River, Little Stony Brook, Johnson Brook, and Fletcher Brook.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Fishing is a priority public use and a traditional use in the CFA. If land is acquired, the refuge will make information readily available to interested anglers regarding opportunities to fish on Service-owned land, location of fishable waters, and the available game fish.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available on the refuge website, at informational kiosks, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography for people of all physical abilities.

Rationale:

Wildlife viewing and photography are priority public uses on national wildlife refuges and a popular recreational activity. Local organizations such as Vermont Audubon chapters and others offer organized field trips to popular natural areas. A new division in this area would offer people the chance to see and photograph wildlife and in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land:

- Allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters and anglers.
- Install an informational kiosk in a conspicuous location to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 5 years of acquiring sufficient land:

- Develop a public access strategy and required planning (i.e., NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring sufficient land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with a friends group and other partners that host events designed to view wildlife on the division.

Rationale:

The entire division would be available for wildlife observation and photography; however, there are steps the refuge can take to enhance the experience. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of acquiring sufficient land:

- Develop interpretive panels for kiosks and trails that describe typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.
- Encourage local schools and groups such as a local chapter of Vermont Audubon and other environmental organizations to offer wildlife-centered trips to the refuge.
- Produce a list of wildlife species and associated habitats and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.

Within 10 years of acquiring sufficient land:

- Develop a public access strategy and required NEPA documentation that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the White River Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional water-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as fishing, boating, and wildlife observation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any water trails (e.g., canoe/kayak trails) that part of a regional or State network for their compatibility.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the White River Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Land water-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking, wildlife observation, and interpretation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Develop compatible opportunities on the White River Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land:

- Allow dispersed hiking, snowshoeing, and cross-country skiing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Work with users to delineate winter cross-country skiing trails and determine whether a special use permit to manage winter trails is warranted.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.

Within 5 years of acquiring sufficient land:

- Work with Friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge divisions and units.

Overview Putney Mountain Unit (Existing Refuge Unit)

Brookline and Putney, Vermont

| | |
|-------------------------------|-----|
| Total Unit Acres ¹ | 285 |
|-------------------------------|-----|

¹Acres from Service's Realty program (surveyed acres)

Summary

What are the priority habitat types within the unit?

- Hardwood forest - 99.5%

See map A.69 and table A.51 for more detailed habitat information about the unit.

What are the Federal trust and other natural resource values in the unit?

1. Endangered Species

The wetlands of the Putney Mountain Unit are home to a population of northeastern bulrush, a federally endangered wetland plant known to colonize areas with variable water levels. In the case of Putney Mountain, the population occurs along the periphery of beaver-influenced wetlands.

2. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA), and habitats along the main stem, receives higher use by migrating landbirds. As birds move north, they disperse beyond the Connecticut River main stem, becoming more evenly distributed in habitats across the watershed (Smith College 2006). The forests in the Putney Mountain Unit are important stopover habitat for landbirds.

3. Wetlands

The beaver-influenced wetlands at Putney Mountain create habitat conditions necessary for the federally endangered northeastern bulrush to persist.

What habitat management activities would likely be a priority on refuge lands within this unit?

We will conduct a comprehensive, multi-scale wildlife habitat inventory. Baseline information on the condition of habitats (e.g., forested, non-forested and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down habitat management plan (HMP). Once inventory has been completed, then management will focus on the following:

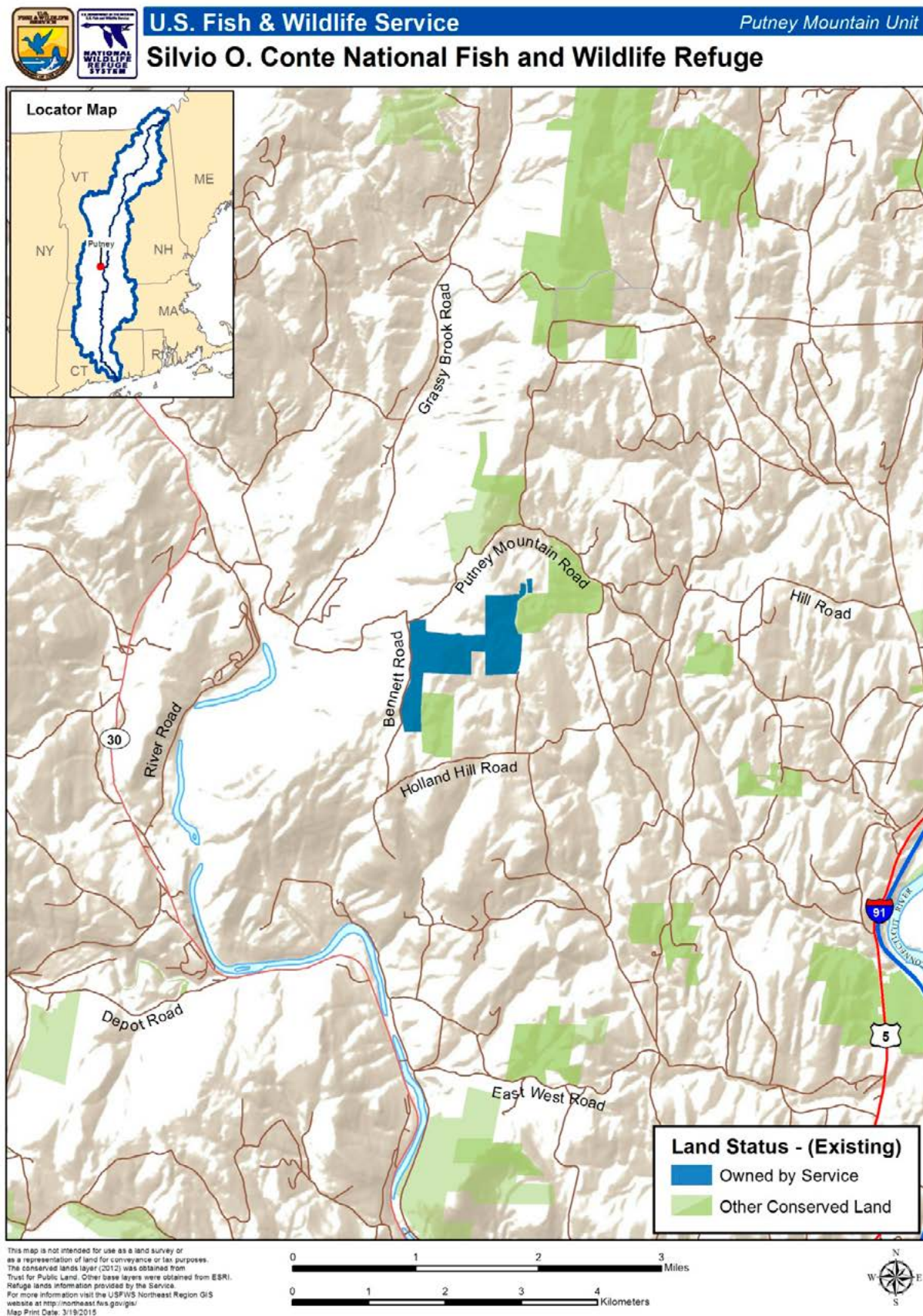
- Manage freshwater marsh habitats to support the northeastern bulrush.
- Manage invasive plants to maintain native diversity.

What public use opportunities would likely be a priority on refuge lands within the unit?

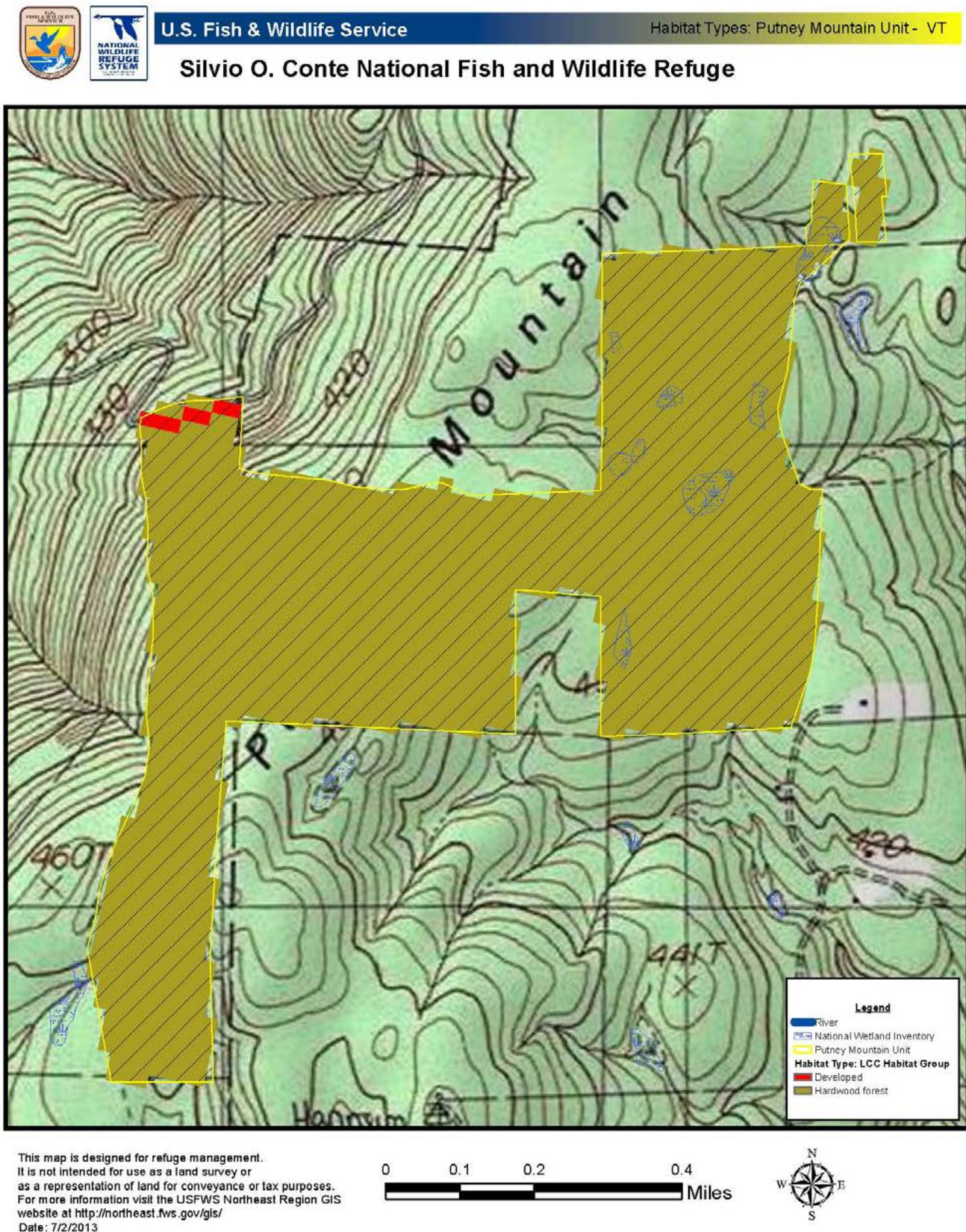
The National Wildlife Refuge System Improvement Act of 1997 identified hunting, fishing, wildlife observation, photography, interpretation, and environmental education as priority, wildlife-dependent uses. As such, these uses would receive priority on refuge lands.

We propose to construct additional trails to enhance public use opportunities on the unit. See map A.70 for the proposed public use trails and other infrastructure for the unit.

Map A.68. Putney Mountain Unit – Location.



Map A.69. Putney Mountain Unit – Habitat Types.



Map A.70. Putney Mountain Unit – Existing and Proposed Public Use Facilities.

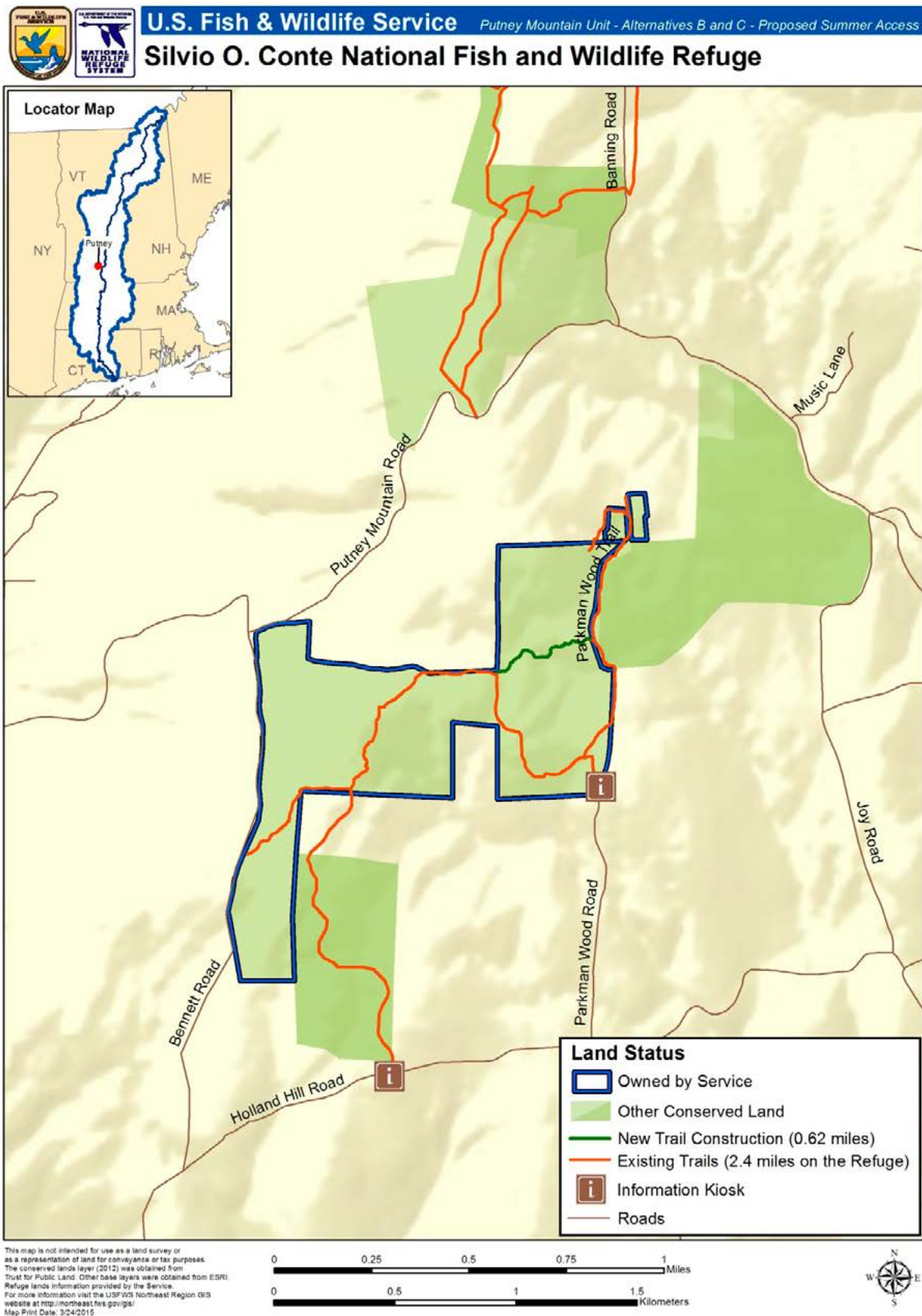


Table A.51. Putney Mountain Unit – Habitat Types.

| LCC General Habitat Type ¹ | Unit | |
|--|-------------|---------------|
| | Total Acres | Percent Unit |
| Forested Uplands and Wetlands² | | |
| Hardwood forest | 282 | 99.5% |
| <i>Forested uplands and wetlands subtotal</i> | <i>282</i> | <i>99.5%</i> |
| Other | | |
| Developed | 2 | 0.5% |
| <i>Other subtotal</i> | <i>2</i> | <i>0.5%</i> |
| TOTAL | 284 | 100.0% |

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Goals, Objectives, and Strategies for the Putney Mountain Unit under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1b. (Biological Integrity, Biological Diversity, and Environmental Health)

Where and when appropriate, protect, or restore habitats absent an identified species of conservation concern, recognizing the importance of all habitats in contributing to the biological integrity, diversity, and environmental health of refuge lands and the Watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Putney Mountain Unit where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats, by virtue of refuge land ownership, represent small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and provide additional structural and species diversity to the matrix. A rich wetland environment or a rock outcrop, for instance, is an anomaly in an otherwise forested landscape. They often have a special flora and fauna—beaver influenced water depths that create habitat for particular plants, or rhyolite bedrock that support rare lichen. One could make the case that these beaver-influenced wetlands are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context.

Some habitats within the unit will be managed under a more classic coarse-filter approach—primarily those areas where the federally listed northeastern bulrush has been documented. USFWS policy requires species-specific management efforts in the case of rare, threatened, or endangered species. New trail development on the unit has the potential to negatively impact bulrush populations. Refuge staff will continue to monitor the known bulrush populations (see sub-objective 1.2a).

Combining coarse and fine-scale conservation efforts under the rubric of BIDEH will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually, and more targeted strategies for those rare, threatened, or endangered species like the northeastern bulrush. Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the Unit is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Control invasive species, with priority given to carefully controlling reed canary grass and glossy buckthorn.
- Work with partners, including the State of Vermont, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Monitor impacts to sensitive habitats from the introduction of trail users.
- Monitor known northeastern bulrush populations.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Freshwater Marsh)

Manage freshwater marshes to support the federally listed northeastern bulrush, and wetland associated natural and rare ecological communities.

Rationale:

Freshwater marshes are often dominated by emergent and submergent herbaceous vegetation. Scattered shrubs are often present, and trees are generally absent. Herbaceous vegetation typically includes common bulrush, jewelweed, marsh fern, water lily, and narrow-leaved cattail. This habitat is associated with lakes, ponds, impoundments, and slow-moving rivers and streams (Gawler 2008). These marshes are also maintained over time by beaver activity, an important natural disturbance process within the Putney Mountain Unit.

The northeastern bulrush, a wetland plant, occurs in isolated small wetlands within the unit. This species is federally listed, and has adapted to seasonal water fluctuations. Habitat alterations that change the hydrology of a wetland to be consistently wet or dry may have negative consequences for this species. Biologists are currently monitoring known populations, but more information is needed on the habitat requirements, reproductive strategy, and genetic variability (U.S. Fish and Wildlife Service 2006). Research, and preventing habitat destruction and deterioration of wetland sites where this plant is found are crucial steps to maintaining this northeastern bulrush population.

Implementation of refuge strategies will begin with a comprehensive, multi-scale habitat inventory. Plant surveys of freshwater marsh habitats will inventory all species present, but will focus on northeastern bulrush occurrences. This baseline information will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of CCP approval:

- Minimize refuge activities that disturb wetland communities.
- Carefully control reed canary grass and glossy buckthorn, which are beginning to invade northern bulrush habitat.
- Explore and support research opportunities with academic partners to address information gaps for northeastern bulrush.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Inventory wetland plant communities, and evaluate wetland hydrology for potential impacts to the natural flow regimes.
- Survey wildlife use of existing wetlands.
- Map natural communities; protect rare or exemplary examples.
- Work with the State Natural Heritage Program to annually monitor the presence/absence of current northeastern bulrush populations in emergent wetlands.

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the Putney Mountain Unit as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education.

Management Strategies:

Within 1 year of CCP approval:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Putney Mountain Unit as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Putney Mountain Unit as an outdoor classroom.

Rationale:

Because this unit will be unstaffed, the majority of environmental education opportunities on this unit will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of CCP approval:

- Encourage schools, scout groups, and summer camps to use the Putney Mountain Unit as an outdoor classroom.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the Putney Mountain Unit. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. At the Putney Mount Unit interpretation can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With several trails and a kiosk, the unit is primarily a place for self-guided, wildlife dependent interpretive experiences. Other groups, such as the Putney Mountain Association, may also occasionally present interpretive programs that convey messages about the refuge and about the Putney Mountain Unit's habitats and cultural resources.

Management Strategies:

Within 5 years of CCP approval:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the Putney Mountain Unit.
- Provide resources and trainings to Friends and volunteers in support of interpretive programs.

Within 10 years of CCP approval:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Management Strategies:

Within 5 years of CCP approval:

- Through partners, and Friends group, annually provide quality interpretive programs and printed media at the Putney Mountain Unit.
- Incorporate thematic statements, measureable objectives, and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures, i.e., general brochure and bird checklist that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of CCP approval:

- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Putney Mountain Unit would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Putney Mountain Unit would be unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and which provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access, and Infrastructure)

Provide the opportunity for a quality hunting experience following state regulations, except as noted under Strategies below.

Rationale:

Hunting is allowed on national wildlife refuges, as long as it is found to be a compatible use. Because of its array of habitats, the unit is a desirable location for hunting white-tailed deer, wild turkey, and small game species. This area and the surrounding lands have been used for hunting for many years.

Management Strategies:

Continue to:

- Allow hunting based on regulations which correspond to the State of Vermont regulations with the following exceptions:
 - (a) The building or use of permanent tree stands or ground blinds is prohibited.
 - (b) Temporary blinds are permitted, but must have the owner's name and address visible on the blind and the blind must be removed at the end of the hunting season.
 - (c) The use or possession of alcoholic beverages while hunting is prohibited.
- Allow hunters access to the refuge outside of the normal division open hours (i.e. 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.

Within 1 year of CCP approval:

- Retain current unit hunting regulations which correspond to the State of Vermont regulations with the following exceptions:
 - (a) Retrieving dogs must be under voice command at all times.
 - (b) Nighttime raccoon hunting with dogs requires a special use permit.
- Request that the VFWD promote hunting by featuring refuge opportunities in their annual hunting and fishing digest; also use the digest to describe any refuge-specific regulations.

Within 5 years of CCP approval:

- Work with the Vermont Fish and Wildlife Department to determine whether opportunities exist for State-recognized disabled hunters, and if so, identify potentially new infrastructure.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Work with Vermont Fish and Wildlife Department to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide state-sponsored hunter education classes access to the unit. Conduct directed outreach to ensure hunters are informed about refuge-specific regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, web pages, media releases, etc.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the unit with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience. The unit's visitor contact station and its surrounding grounds provide an ideal setting for this type of instruction. In addition, the meeting space and grounds can also be used for onsite archery programs, directed by volunteers, with staff support.

Management Strategies:

Within 1 year of CCP approval:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge website and at Putney Mountain Unit informational kiosks.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of CCP approval:

- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

This objective is not applicable because the Putney Mountain Unit does not have any waterbodies suitable for fishing.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography at the Putney Mountain Unit.

Rationale:

Wildlife viewing and photography is a priority public use on national wildlife refuges and a popular recreational activity in this area, in particular during the fall hawk migration. Currently, infrastructure is limited to several informal hiking trails that bisect the unit and connect to a larger network of conserved lands. Fostering wildlife observation and photography is in keeping with the other conservation landowners along the Putney Mountain ridgeline.

Management Strategies:

Within 1 year of CCP approval:

- Allow wildlife observation and photography at the Putney Mountain Unit.
- Allow public access for uses other than hunting, at the unit daily from 30 minutes before sunrise to 30 minutes after sunset.
- Add information on the unit to the refuge website.
- Work with the Putney Mountain Association to install informational kiosk(s) on refuge and/or partner lands in order to orient visitors and provide information about the general area.

Within 5 years of CCP approval:

- Work within the Putney Mountain Association, Windmill Ridge Association, and other partners to develop a public access strategy that responds to the demand for access across all ownerships, provides safe trailhead parking, a well-defined trail network, informational kiosk(s), etc.

Within 10 years of CCP approval:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with the friends group and other partners who host events designed to view wildlife on the unit.

Rationale:

The entire unit would be available for wildlife observation and photography; however, there are steps the refuge can take to enhance the visitor experience. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

Within 5 years of CCP approval:

- Develop interpretive panels describing typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.
- Encourage local schools and groups and environmental organizations to offer wildlife-centered trips to the unit.
- Produce a list of wildlife species and associated habitats, optimum viewing times and locations, and other conservation information on the unit for distribution at informational kiosks, the refuge website, and other popular media.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Not applicable

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Not applicable

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Develop compatible opportunities on the Putney Mountain Unit that support initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the unit without detrimentally impacting the wildlife resource.

Management Strategies:

Within 1 year of CCP approval:

- Allow dispersed hiking and snowshoeing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.

Within 5 years of CCP approval:

- Work with partners to determine whether a virtual geocache course at the unit is acceptable on the conserved property. The course should integrate orienteering with refuge interpretive messages that include linking this unit to other refuge divisions and units.